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COMPUTER SHOPPER™

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Canada $3.00

TERMINAL 141

MONEY SAVING ADS & ARTICLES

Mainframe-On-A-Desk
IBM RT PC
32-BIT SUPER MICRO



In This Issue...

- Hard Disk Backup — Is The Need Being Met?
- Spotlight on Real Estate
- Double Your Memory — Double Your Fun (For Atari 520ST)

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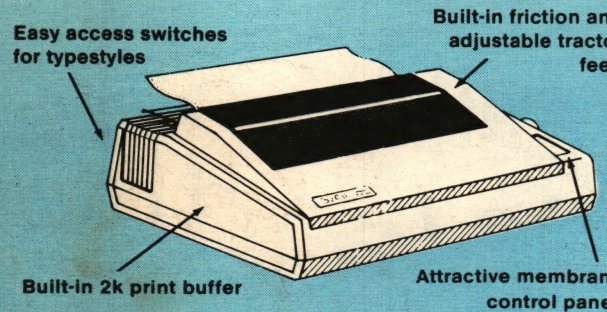
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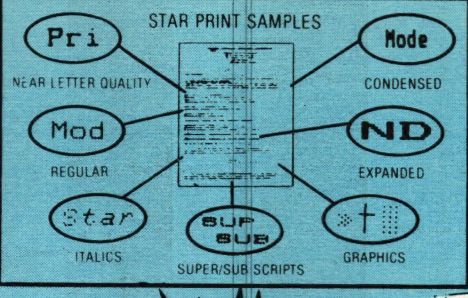
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(REPLACES THE GEMINI 10X)

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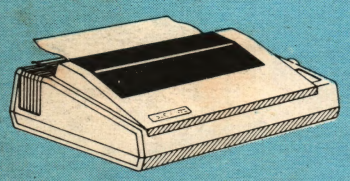
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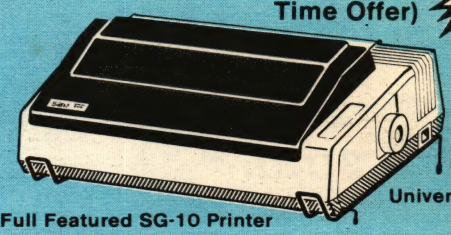
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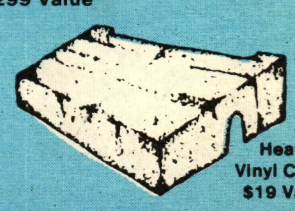


Full Featured SG-10 Printer
$299 Value

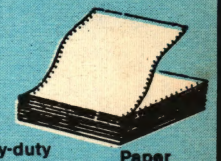


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$19 Value



Paper
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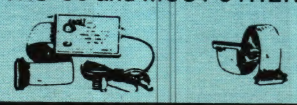
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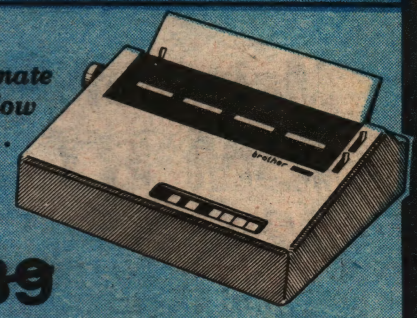
Save $240 off list ONLY ~~$369~~

Printout quality need not be sacrificed simply because of cost. Not only does the HR-15XL give you daisywheel printing at a price that's unbeatable, but added built-in attractions such as a 3k memory buffer (5k optional) for smoother printing and text reprinting to reproduce originals comes standard. Remarkable features such as two color printing and shadow printing gives your letters that added touch of importance. To increase the versatility of the HR-15XL, **brother** has an optional KB-50 Human Engineered typewriter keyboard to turn your HR-15XL into an electronic typewriter with automatic correction capability. Since the HR-15XL is a result of **brother's** advanced technology gained by long years of experience in the electronic office machine field it embodies such welcomed features as bi-directional 17cps printing, proportional spacing, automatic underlining, and super and sub script capability. Supplied either with Centronics parallel or RS-232C interface, the HR-15XL is compatible with most all small computers available on the market. Such options as the cut sheet feeder and tractor feeder offer further versatility to the HR-15XL — in a class way ahead of the rest.

NEW

Get the ultimate performance in a low cost daisywheel printer with. . .

brother HR-10 DAISYWHEEL PRINTER



Save $270 off list JUST ~~$239~~

The NEW **brother** HR-10 gives you superb quality and advanced technology from the company that has long years of experience in electronic office machines. The HR-10 is not only a high quality unit but a printer that will last with a snappy 120 word per minute print speed. It uses the renowned **brother** cassetie daisywheels for ease in changing and the **brother** mess-less ribbon cassettes. And with the text reprinting feature you can set the HR-10 to continuously print out whatever is stored in the 2k memory buffer — all this at the touch of the front panel control. Control codes emulate Diablo 630 codes for universal compatibility with most software. Other standard, time-saving features include super and sub scripting, automatic underlining, and bold printing giving your printout a professional quality cleanliness. The HR-10 is capable of printing most 4 part forms and accepts a paper width up to 11½ inches. This new addition to the **brother** HR series represents an outstanding value for a personal daisywheel printer.



Make your office beautifully efficient with. . .

brother HR-25 DAISYWHEEL PRINTER

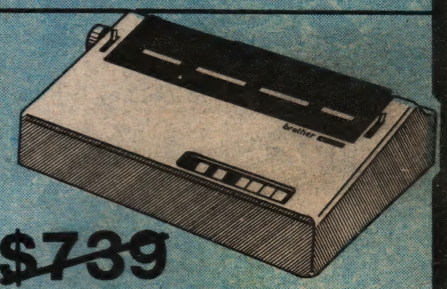
Save $395 off list ONLY ~~$499~~

brother's HR-25 daisywheel printer has been specially engineered to keep pace with your high volume while producing clean, clear pages of the most beautiful letter quality. Since the HR-25 incorporates a 3k buffer and can print out bi-directionally at a rate of 23 cps, output will never lag behind demand. Once into the buffer, information will be held for repetitive printout with the text reprint function — originals can be produced without end. Previously if you desired to stress certain areas of a text you had to underline the area or type it in uppercase letters. The HR-25's bold type function and red color printout make those stress points literally jump off the page, an especially welcome feature for important reports and letters. Character pitch is selectable among the settings of 10, 12, and 15 positions per inch in addition to proportional spacing. Other features such as super and sub script, auto underlining, carriage skip movement, and easy drop-in ribbon cassettes and daisywheels put the HR-25 ahead of the competition. It is equipped with either a centronics parallel or an RS-232C serial interface and DIP switches conveniently located for easy access, the HR-25 is easily adapted to your computer system. With **brother's** renowned reliability and easy add-on accessories (cut sheet feeder, tractor feed) the HR-25 will increase your office efficiency to unexpected levels.

Free EXCLUSIVE 1 Year Direct Replacement Warranty on Selected Models

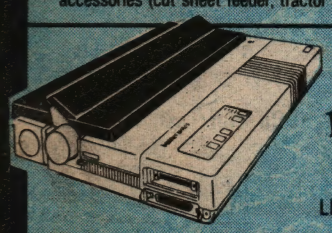
For the high output office get the. . .

brother HR-35 DAISYWHEEL PRINTER



Save $495 off list ONLY ~~$739~~

One of the main concerns in a high output office is putting out the work required without concern. **brother's** HR-35 will not only print out whatever is on your word processor's mind with the finest daisywheel beauty, but will print it out with a speed (32 cps) and accuracy that will keep your work moving in the right direction. Because the HR-35 incorporates a big 7k (23k optional) buffer memory, your computer will be free for other operations almost as soon as you give it the print command. And that buffer won't stay full for long, thanks to HR-35's 32 character per second print speed and bi-directional logic seeking carriage movement. But the HR-35 does not give up efficiency for speed. Since the printer head comes to a full stop at each strike zone, the high quality of the daisy wheel is taken full advantage of. HR-35 presents you with a host of other welcome features such as two color and bold printing, just the thing to make your text stand out. Extras include super and sub script function, auto underlining, proportional spacing, text reprinting, clear buffer and easy to use front panel control for all the main operations. HR-35's back panel allows either centronics parallel or RS-232C serial interface connection. DIP switches are easy to access and attachable options such as the tractor feeder and cut sheet feeder offer increased utility. And it goes without saying that the HR-35 uses exclusive **brother** daisywheel cassettes and ribbon cassette systems for simpler, mess-less changes. **brother** HR-35, a high output printer.



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NEW **brother M-1509**

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The **brother** M-1509 is a dot matrix printer designed to offer reliability, economy, and quiet, easy operation to users of personal or small business computers. Normal print speed is a fast 180 cps (pica), but the M-1509 also provides handsome Near Letter Quality printing at 45 cps. A variety of character sets are available, and the high-density bit image capability produces impressive graphics.

The M-1509 also incorporates a number of cost- and labor-saving features. The large memory buffer releases the computer for other tasks while printing, an optional cut sheet feeder reduces paper-handling time, and the one-inch paper cut function economizes on paper. In addition, the M-1509 is supplied with character sets and control codes compatible with those of the IBM PC and the Epson FX series printers, for easy interfacing with a broad range of computer equipment.

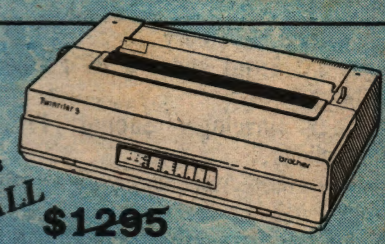
Above all, the M-1509 is designed for people. It is exceptionally slim and light, with conveniently consolidated controls, allowing it to fit easily into a fully-equipped work station without wasting either office space or valuable operator time. It 's also quiet – a fact which, though often overlooked, is of crucial importance in maintaining an efficient, industrious office environment.

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And, of course, the **Twinwriter 5** also features all of the fine functions that have made **brother** printers the choice the world over. Bold printing, superscript, subscript, auto underline, proportional spacing, text reprinting, clear buffer and an easy-to-use front panel to control all major functions. Outstanding cost performance adds up to a savings throughout the entire life of the unit. Economical, compact and versatile. . . the **brother Twinwriter 5** daisywheel/dot matrix printer.

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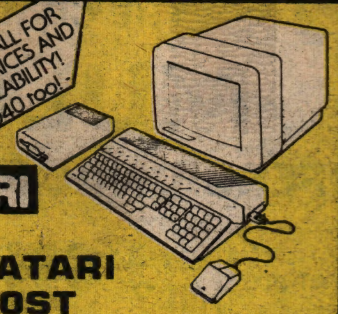
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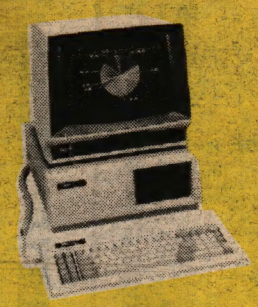


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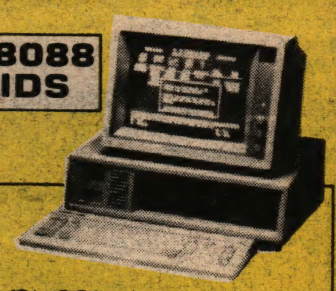
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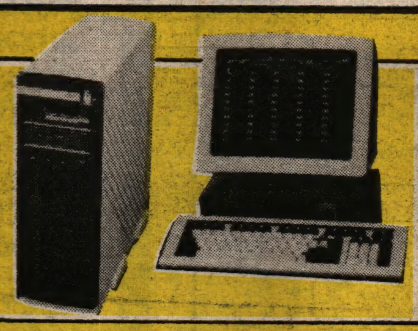
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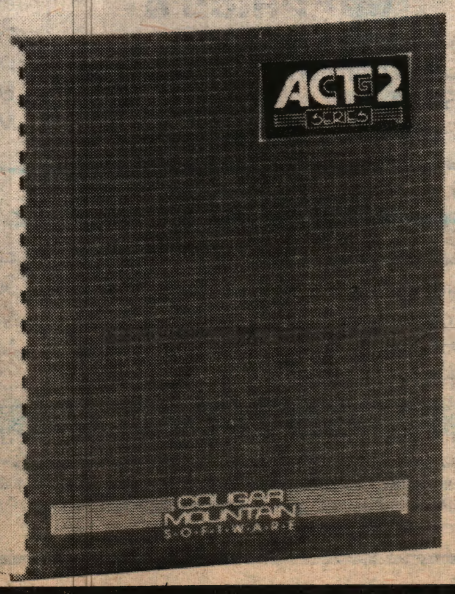
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The Need For Hard Disk Backup Is It Being Met?

by Stan Veit

Pick up any copy of *Computer Shopper*, and you will observe that many companies are selling hard disk drives at very low prices. In fact, on a cost-per bit calculation, it hardly pays to buy a floppy disk. The obvious advantage of a hard disk is the huge amount of data it can store and the secondary advantage is the speed of access. The third advantage is one you become aware of only after you become used to having one, the advantage of having data and programs in a contiguous storage area.

Having everything on the same disk drive is an advantage that makes computer work much easier, but it tends to make people forget basic data security principles. It is time consuming and expensive to make back-ups from a hard disk, and after having a hard disk for a very short time people tend to forget to do it. This is dangerous; hard disks do crash, and when they do, it's a major problem. It should be pointed out that this author like many others, feels that the final answer to data storage will come with some kind of electro-optical storage not yet developed.

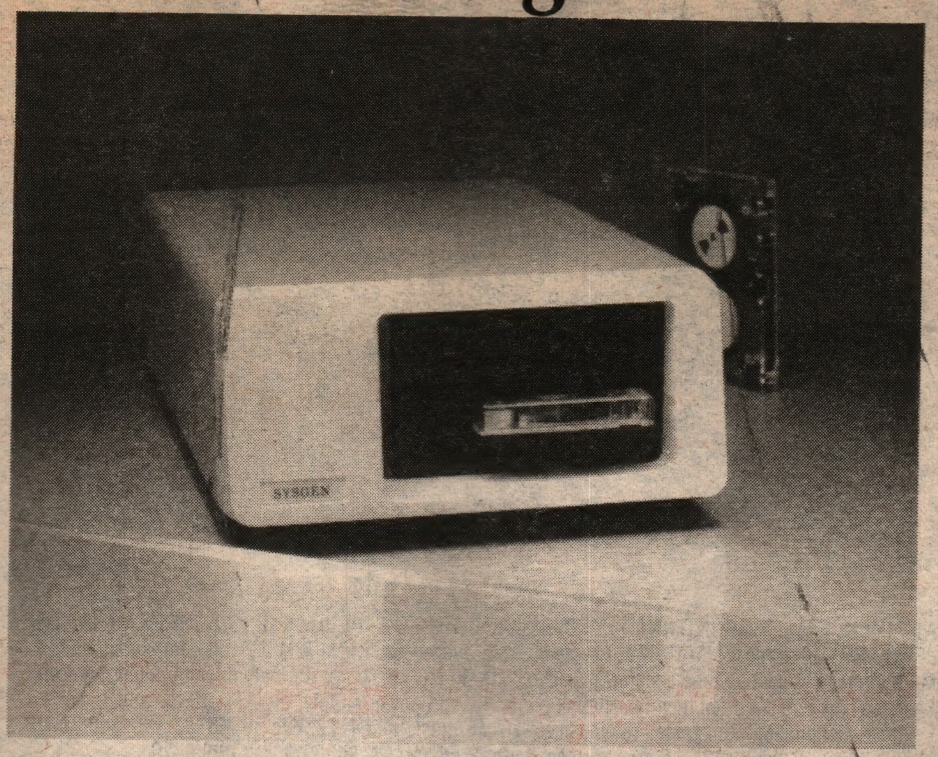
Hard disks in use today are mostly Winchester types using solid platters, covered with magnetic material, which rotate in a sealed environment. Winchester technology was invented by IBM, and no one really knows how the name started. Some say the first one was a 30-30 (30 Mbytes Fixed disk, 30 Mbytes removable - get it? 30/30 Winchester (rifle!). Others say it was just IBM's code name for the project. (Remember the Peanut?)

The amount of data stored on unbacked-up hard disk today is frightening, and it grows every day. How can you back up a hard disk? There are several simple sounding procedures:

First, you can transfer the files you have updated to floppies on a file by file basis. This is a slow process and expensive because it requires quite a few floppy disks. Although high capacity floppies with up to 6 Mbytes of storage are coming into use, it will be a long time before their use is general.

We start out with a resolve to back up everything on floppies. You do it for a while, then become convinced that your hard drive will never fail and you tend to stop backing-up your files. Watch out, you are going to be very unhappy some day if you fail to protect your data.

Second, you can use a hard disk drive with a removable media cartridge. This is a throw back to the original hard disks used for mainframes and minicomputers that had cartridges containing 14-inch hard disks. My first hard disk was a Control Data Hawk, which was the same size as our washing machine. It had a 5 Mbyte fixed disk and a 5 Mbyte removable cartridge. You kept your programs on the fixed disk and your data on the removable cartridge. This was a great idea for its time, but remember that the car-



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tridges cost $80 each, and this technology used heads that were subject to "crashes." The removable cartridge idea has never really taken-off for Winchester technology hard disks, because of the cost factor and the problem of mechanical alignment. The most popular removable type of disk is the Iomega Bernoulli cartridge which is a type of flexible media in a hard shell. This is made in 5 Mbyte and in 10 and 20 mbyte sizes, and the cartridges are safely transportable and can be easily stored. It should be stated here that the main consideration for the use of the Bernolli disks is data security rather than back up.

Another new type of hard disk back-up is the 3-1/2" portable hard disk drive. This is a complete portable hard disk drive that can be unplugged and stored, or transported from one place to another. A rather expensive type of data security, it has found a place in some applications.

Before I get into a discussion of back-up devices, I should mention a back-up problem that is seldom considered and that is the operating system problem. It is difficult to make a back-up system that will operate with more than one operating system. In the IBM PC/XT/AT and compatible environment, at this time you have only one operating system MSDOS. Apple II computers use DOS 3.3, Pascal, and PRODOS. Tandy Model III and 4 computers can use any of a half dozen DOS. As we start to use UNIX and other multi-user operating systems, there will be a requirement for going across operating system to back up data. This will cause problems in developing tape back-up systems.

Having examined some of the back-up methods in use and the stated objections to them, we are left with the remaining method of using some type of magnetic tape as a back-up media.

The advantages of using some kind of magnetic tape are:

* Tape is inexpensive and easy to store or transport.
* Although much slower than any type of disk, tape drives that are fairly fast can be made.
* Tape can be contained in a cartridge that is quite secure from damage.
* Tape cartridges can store large amounts of data in a small space.

In spite of these obvious advantages, the use of tape back-up has been slow to develop among personal computer users of hard disks. Let us examine some of the reasons people fail to do something that is obviously good for them.

Tape storage for large computers is the normal thing and has no relation with the type of tape storage we use with personal computers. Mainframe-type drives are marvels of precision manufacturing and cost more than our complete computer systems. We are not considering them here.

Tape for storing personal computer data has a bad name from the days when audio cassettes were used as mass storage mechanisms. The lack of precision in the drives that were mainly cheap audio cassette players was the main factor. The design of the cassettes and the quality of the tape itself is good enough for audio applications, but not for data. The ear is not a very precise device, if a musical note is dropped, we can not even detect it. But if a bit or two is missing, the data is useless.

Tape back-up units today can use either the 3M-type data cartridges that are precision-made by 3M and a few other manufacturers in 300, 450, and 600 feet of tape, corresponding to 30, 40, or 60 Mbytes of storage capacity (DC300, DC300XL, or DC600 cartridges). Also there is now a mini version (DC1000 or DC2000) that can store 10 to 20 Mbytes in a 2" by 3" by 1/2" package. And there are cartridges that look like Philips-type audio cassettes, but are more precise in their design and manufacture. These store 20 Mbytes and use four tracks for data. The tape drives using these cassettes are called reel-to-reel tape cassette drives that use two dc servo type motors to move the tape, in place of the capstan-driven system used in audio recorders.

The third type of tape cartridge in use looks like a spool of typewriter ribbon or a miniature tape spool.

The recording methods used in tape backup units vary according to manufacturer. There has been an attempt to standardize on recording formats, and the QIC (Quarter Inch Compatibility) Committee has set standards for 9-track recording that are used more-or-less by manufacturers of this equipment. According to my sources of

continued on page 10

Fastback For Fast Floppy Backups

by L.A. Olivet

Fastback is a software solution to the hard disk backup problem for IBM PC and compatibles. It is a program that enables you to backup your hard disk onto floppies at amazing rates of speed. A full 10 Mbytes can be backed-up in eight minutes if you are ready with disk to put into your drives on command from the program. The backup disks need not be formatted since Fastback formats them "on-the-fly" while the backups are being made. I tested Fastback on a 10 Mbyte hard disk that was rather new and only had about 2 Mbytes on it. The backup program took us 4 minutes to record our data on four disks. Not bad, I think that if I was more experienced and knew what to expect, I could have shaved a minute off that time. Fastback called for five disks to be inserted in turn, but only required four of them.

I would consider the backup provided by Fastback to be perfectly satisfactory for my use except for two things. It is copy protected and I will not depend upon any copy protected software in a vital function. The cost of Fastback is $179 list price. At Christmas they advertised it for $149. I would personally rather use COPY and save my money toward a tape drive. Outside of those reservations, Fastback works as advertised and is a boom to those without a backup peripheral. For information:

5th Generation Software
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Hard Disk Backup
continued from page 9

information, there still is no uniformity among makes of tape back-up systems.

The 9-track recording method has only one track on the tape, but it is folded back to form nine continuous tracks. It is referred to as the serpentine method. The tape is driven in one direction and then back again until all nine tracks have been used. It is somewhat like phonograph record tracks that are one continuous spiral. The tape need not be rewound between each of the recording passes or formatted before use, which is a considerably time saving. The actual recording can be either a complete streaming dump or a file-by-file backup. The head has two sections, a read and a write section, or gaps. As data is written on the tape, it can be instantly read and checked for errors. A bad byte is detected and rewritten "on-the-fly" so that the process is completed very rapidly. The trouble with this is that the checking is done only when the data is recorded. If some damage to the track occurs after recording, it will not be picked up in subsequent readings. A variation on this method is used by Tallgrass Technology; it is called the PC/T (Personal Computer/Tape method.) It attempts to repair damaged blocks while reading the tape.

The other recording method is the floppy tape system in which the tape cartridge is used as if it were a floppy disk. It is formatted and appears to the computer as a floppy disk drive. This has advantages in that it can be used with a port on the existing floppy disk controller, but it is very slow for a tape back-up method. It is, however, inexpensive and reliable, and with the proper software, it is easy to use. When I say slow, I am talking about 18 minutes to servo-write the tape, 18 minutes to format the tape, 18 minutes to verify it. Then you can use it to back up your disk!



AT ADD-IN FAMILY OF INTERNAL HARD DISK/STREAMING TAPE BACK-UP SUYBSYSTEMS IS COST-EFFICIENT: The three AT-ADD IN subsystems from Sysgen each give IBM AT and compatible users 60 MB automatic streaming tape back-up plus a 20 MB, 30 MB, or 70 MB (formatted) self-booting hard disk. Because they use the computer's hard disk controller and power supply, the AT ADD-IN models are particularly cost-efficient. Suggested retail prices: 20 MB ddisk model, $2,095; 30 MB, $2,595; and 70 MB, $4,995. Sysgen, Inc., 47853 Warm Springs Blvd., Fremont, CA 94539. (415) 490-6770.

I will not attempt to discuss all the merits of various tape drive manufacturers. *PC Magazine* has done an excellent job in their February, 1986, issue. They tested thirteen typical tape drives and reported in depth on these drives. I will discuss the important thing for most users, the cost of tape back-up.

You will see immediately that the price of the tape back-up is at least double that of hard disk drives. Since the tape drive is not as complicated as the hard disk drive, you may very well wonder about this huge price difference. Well, originally there was no such price variation; in fact, the hard disks cost much more than the tape drives. Now the hard disks are being mass produced by automated factories in the U.S. and Japan, and competition has driven the price down to as low as $200. Jack Tremiel of Atari has stated he believes that, given enough quantity, the price of 10 Mbytes will be about $60, and that he intends to offer a complete hard disk system for less than $200. However, production of tape back-up units is still small, and the precision and testing required keeps the price high. Until the mass manufacturers turn their attention to tape drives, the price is going to stay high.

The question each user must ask is, "Do I really need tape back-up, and if so, what kind?"

If you are a business user of personal computers, you must have some kind of back-up and data storage. You cannot rely on your hard disk alone. You can do a file-by-file floppy disk back up if you are willing to stop work at least one hour before closing to back up those files you changed during the day's operations. If you have a tape unit, merely press a button and walk away while the back-up is completed. You can also put your back-up in a safe or other secure location. A business cannot use a computer without some kind of tape back-up.

On the other hand, I am a non-business user and most of my work is in testing software and writing articles and books. I will not buy a tape back-up until the price comes way down. Most of my work needs only temporary backup, and my floppies are good enough for that. Even when I write a book, I back up on floppies any chapters I change. Since I can work on only one chapter at a time, this is no hardship. My money can be much better spent than on a back-up tape unit.

In passing, there is another type of tape back-up I should mention. Alpha Micro long ago developed a method of recording data on a VCR. They have used it for years, and it works. They have now released a controller board for the IBM PC and compatibles. If you already own a VCR (more than 50% of TV owners own a VCR), you can record more than 80 Mbytes on a video cassette which costs very little these days. (If you are interested, call Alpha Microsystems at 1-800-992-9779. Tell them you read about it in *Computer Shopper*.)

Conclusion: The need for hard disk back-up is being met at prices that exceed the price of the disk drives. Therefore, only a few hard disk users are buying them. This is a ticking time bomb for these users if they are not backing up their work with floppies.

Most users have little idea how their disk works. The heads fly a few thousandths of an inch (microns) above the recording surface. When you turn off the drive, the head "lands" on the surface, and when it is started up again, it takes off and flies again. This has a tendency to wear the recording media on the platter. Although the drive can use spare tracks to replace damaged ones, if you use files a lot, you will eventually damage and loose them. Some drives have a designated landing and take-off area to prevent this damage. But most use a random area, in other words--anywhere the head happens to land. Experts recommend that, if a business organization uses its drive every day, it should run it off a UPS (Uninterruptabe Power Supply), and never turn off the hard disk drive.

Another source of trouble is caused by electrical surges and brownouts which can damage the drive, or the data on the drive. This happens all over the country these days. Lightning is another threat to the drive, and you must protect against it. Include this protection on your modem lines, as well as your power lines.

If you are a heavy user you can count on trouble after six months to a year after you start to use your hard disk (right after the warranty is up.) If you can get an extended warranty, by all means buy it. Fixing hard disks is so expensive that, if the prices keep going down, you might find that your dead disk is expendable. In any event, you need backups when trouble comes.

NOTE: I wish to thank David Davis of Space Coast Systems for his help in preparing this article.

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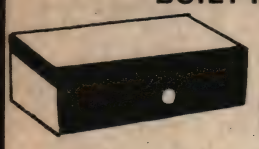
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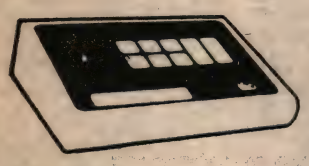
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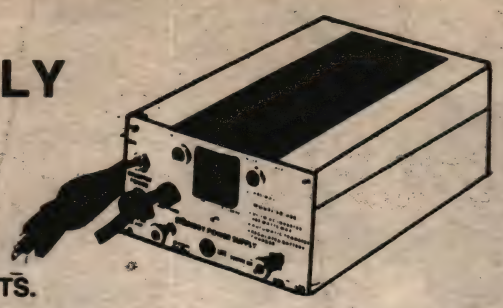
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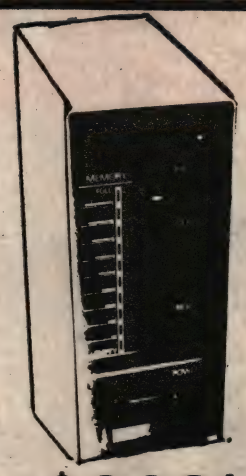


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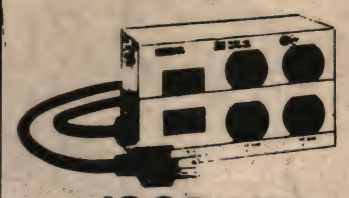
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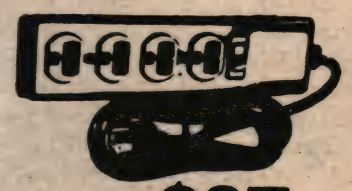
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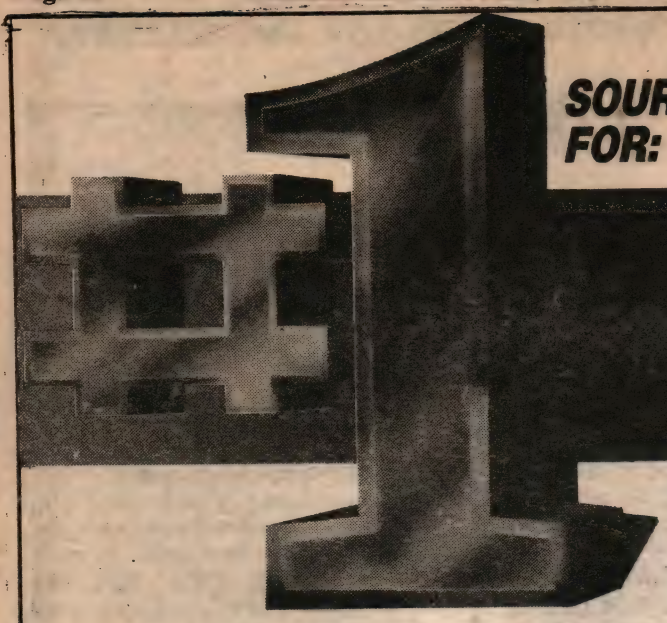
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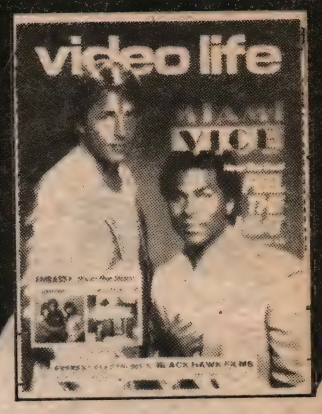
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Editorial

By Stan Veit

Books!

Les Solomon and I wrote the first computer book addressed to potential microcomputer owners. It was titled *Getting Involved With Your Own Computer* and it was published in 1976 by Ridley Enslow, an independent publisher. Ridley took a chance and published although none of the large book publishers thought that there were enough people interested in actually owning their own computer to support such a book! *Getting Involved*, sold about 40,000 copies before it became obsolete. It would have sold more had Ridley let us write a second edition and a third and so on. We did not realize how fast a personal computer book would become obsolete and Ridley printed so many copies that he could not afford to go into a second edition. His next book was on breast feeding infants, a more stable subject.

By 1983, if you walked into any book store you would find a solid wall of bookcases plus several racks, all filled with personal computer related books. Every publisher had long lists of new computer books they intended to bring out in a few months. If you had ever had an article published in a magazine, or even in a club newsletter, an Acquisition Editor for a publishing company would hunt you down and sign you to a contract for at least one book. The advance money was splendid.

All my writing friends who covered hi-fi, television, video, and any quasi-technical field became instant computer experts writing "instant computer books." Even software and computer manufacturers got into the act by retaining stables of writers, to write books touting their products. Commodore did not supply a manual for the C-64, just an *Operator's Book*. You had to buy a $19 book from Howard Sams to get the vital information you needed to use the computer. Apple had an instant book written for the Apple IIc which was released at the same time as the computer. Microsoft and Ashton Tate became book publishers as well as software publishers. All of the book publishers became software publishers.

Computer stores sold books, so book stores started to sell software. Ever try asking some clerk in a bookstore how a program works? A little worse than asking a clerk in a computer store.

This went on for quite a while until something happened, as it usually does with bubbles. It burst.

The book business is somewhat unusual, a book is never sold until you pay your money and take it home. The book store pays for the books it buys on the normal 30-day terms, but if the books stay on the shelves and do not sell, they can send them back for full credit!

That is why book salesmen do not overstock the stores. A good salesman is one who knows what and how many books a store can sell and who never lets the buyer overload. When the books come back for credit, the salesman's commission and the writer's royalties are debited. They have to give back money.

By the end of 1984, the bubble had burst and the walls of personal computer books were gone from the bookstores. Publishers lists were cut to the bone and writers who submitted their manuscripts had them rejected for one reason or another resulting in a no-pay situation. Several major publishers completely stopped publishing computer titles. They wrote-off thousands of books and hundreds of advance payments to authors.

My writing friends went back to writing about audio, video, telephones, sex, anything but computers. I personally lost a couple of books and a little extra income I made as a ghost, fixing up other people's books for the publishers.

Walk into a book store today and look for the computer books. They are all on that rack in the back. Just a few titles on the latest and greatest software system, or new computer. Outside of the big cities, its almost impossible to find a selection of helpful books. The pendulum has swung back the other way and as pendulums do, it has swung too far. We computer users are vociferious readers, calling for more and more information about the things that interest us. That is why we buy so many books and magazines on our favorite subject. We are now being shortchanged by the book publishing industry. Books that publishers would have gladly published two years ago are being rejected because they feel that they wouldn't have a chance to return their costs on the book racks.

The United States IRS has a great deal to do with this. In years gone by, a publisher would publish a worthwhile book that might be a slow mover because it was a textbook or a technical tome. The edition was warehoused and sold according to demand. Sooner or later the edition would be sold out and the author would issue the next edition. These books became the "standards" which were the foundation of the technical and text book publishing industry. Then the IRS changed the rules on how these books were to be valued and taxed. I am not an accountant and do not understand exactly what the ruling was, but I do know the result. The IRS caused more books to be destroyed than Hitler did. Nobody cried out, shame!

In the days before the great computer bookstore blitz, there were a lot of mail order book dealers who sold computer books. Most of them went into software or hardware when they could not compete with the local bookstore in the mall. where people could get the book off the rack. Book readers will pay more to get a book off the rack when they want it.

Now that this situation has changed, I would like to see them return to selling books and create an active market for good computer books. All you have to do is to advertise them in *Computer Shopper* and give a little discount for mail order sales. You will make money, the market is there and people will buy. We review quite a few books in *Computer Shopper*, we would devote more pages to book reviews if we had more ads from book publishers or mail order dealers.

People always ask me, "Stan, how come your editorials often end up with a pitch for subscriptions or advertising for *Computer Shopper*?" "How about your editorial independence?" "Well," I answer, "I have all the independence I need, no one tells me what to write about or what to say." However, we are a capitalistic, money-making organization and I would like to have these pages to expound my ideas for many years to come. Look around you, most of our competitors are gone from the newsstand. Gone with the books! If you want to keep this wonderful magazine, subscribe to it. If you want to make money for your company, advertise in it. ●

LINDENHURST





by Corey Strongin



Present

Next month we will review a remarkable Graphics Presentation Package that enables IBM PC/XT users to store, sort and display graphics for a sequential presenation.

Don't miss this article because the package will be offered to our readers at a special low price. ●

Correction For Christmas List

In our Christmas Shopping List, we listed Magtek Media as having a special on disks for $29.95. This was an error on our part. The special was for $45.50. However, in view of this, they will sell disks for $39.95. ●

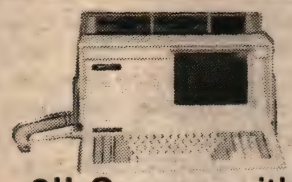
Computer Shopper At West Coast Computer Faire

Computer Shopper will be at the West Coast Computer Faire this year as in past years. The Faire is being produced by The Interface Group April 3 through April 6, 1986. The Interface Group owns and produces the industry-wide Comdex Shows. This should result in a return to the traditions established by Jim Warren. The West Coast Computer Faires have always been a gathering of the computer clans from all over the world. A show where a small company could afford to introduce a product for the first time and where big companies tested their new ideas on the users and could get instant feedback.

The *Computer Shopper* booth will feature some of our contributing columnists. Don Lancaster, our Guru of Apple, will be there and so will L.J. Kutten, the Universe Master of Mac-Universe. Stan Veit, your Editor, will also be at the booth to talk with you and listen to your ideas. Both L.J. Kutten and Don Lancaster are scheduled to appear in seminars presented as part of the Computer Faire. Look for their panel schedules, since both of them are experts worth listening to. Don is famous for his many *Cookbooks* published by Howard Sams. L.J. Kutten is an expert on Computer Law, as well as a columnist for *Computer Shopper*. ●

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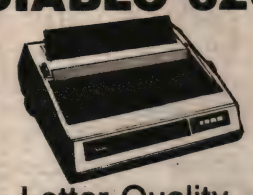
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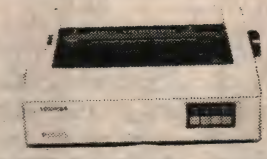
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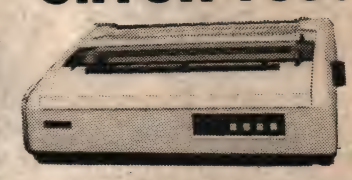
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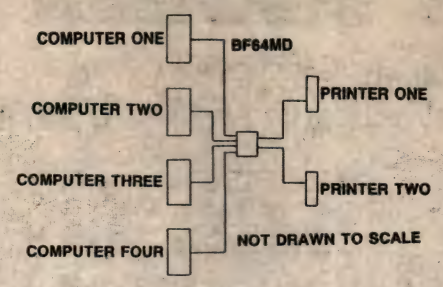
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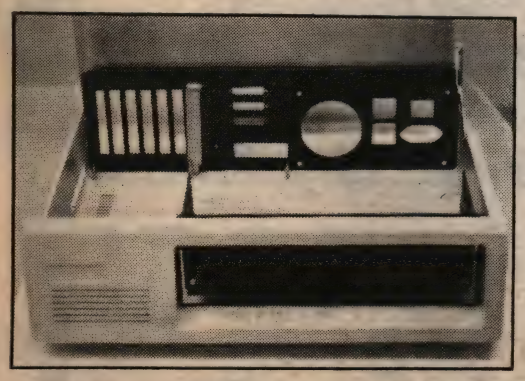
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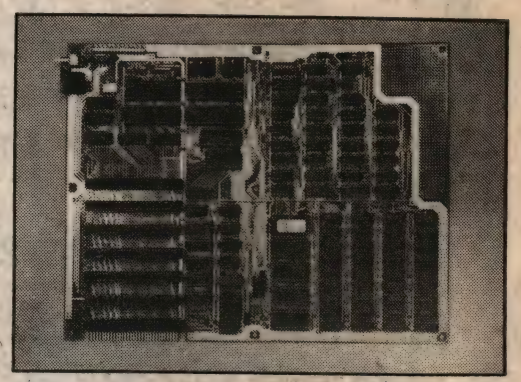


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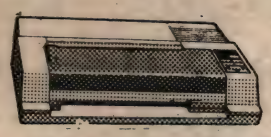
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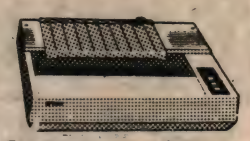
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SPECIFICATION	
Processor	16 bit V20* (8088) with option 8087 Coprocessor
Clock Speed	4.77 MHz
ROM	8K standard, expandable to 56K with EPROM
RAM	256K standard, expandable to 1MB (640K on DOS)
DMA	4 channels
Timer	3 channels
Interrupt	8 levels of vector interrupt
Expansion slot	8 standard IBM compatible slot (7 long, 1 short)
Power Supply	150 watt, 110/220 vac, 50/60 Hz power for 4 floppy or hard disk
Keyboard	Standard 83 key IBM 5150 compatible, option of 5151 selectric type keyboard or AT-style 84 key keyboard
Speaker	Built in 2¼ inches 8 ohm .25 watt
Parallel	1 standard 25 pin female
Printer Port	(Same as IBM), with option up to 3 port
Serial Port	up to 2 optional RS-232, baud rate from 110 to 19200 baud
Floppy Disk Drive	2½ height Panasonic 5¼" double sided, double density 360K drive with controller for 4 drives option
Display Adaptor	includes the choice of Monochrome Graphic with 720 x 348 Hercules emulation or standard 320 x 200 IBM color compatible adaptor
Operation System	Option of PC-DOS, MS-DOS, Concurrent-DOS, CPM/86

*V20 by NEC is the superset of 8088 and pin to pin compatible with 8088, increases speed of pc from 40% to 80% (rated 1.8 according to Norton Utility 3.0's system information while IBM PC and PC/XT are rated 1.0 as standard) without changing the clock speed of the system, run all IBM PC compatible software with no problem.

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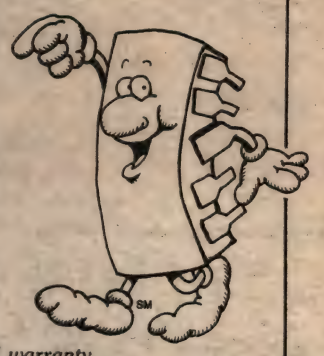
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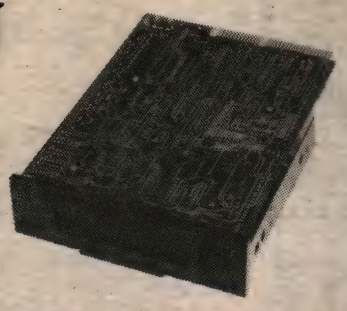
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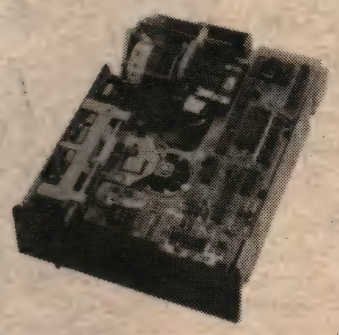
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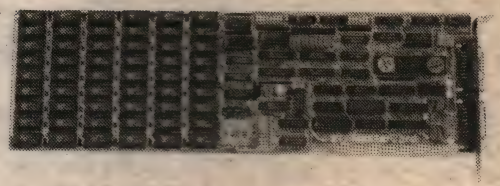


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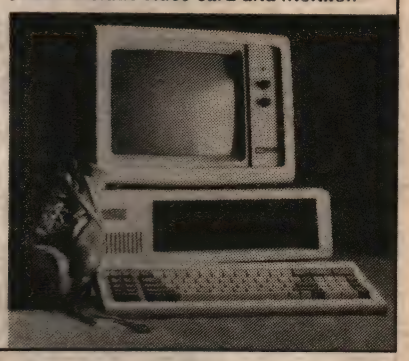
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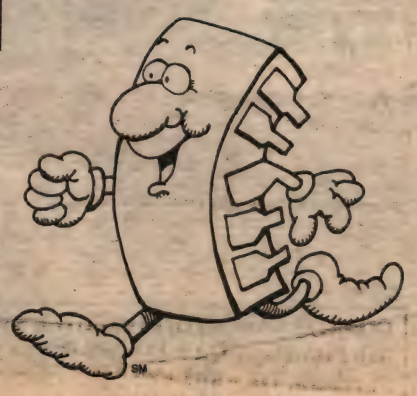
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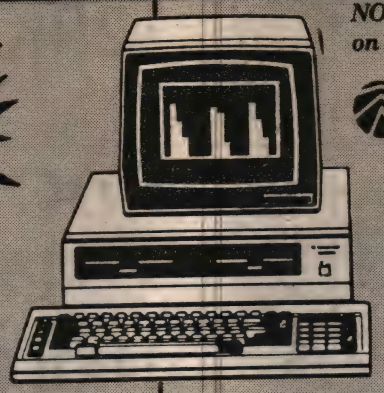
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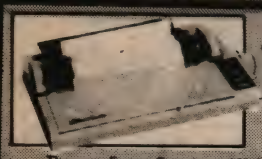
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The new Epson Spectrum LX-80 is perfect for the vast majority of your personal and professional printing needs, such as reports, term papers, recipe files or mailing lists.

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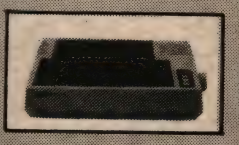
Because the LX-80 is made by Epson—the standard of the industry— it's compatible with virtually every computer system made. It inherits a reputation for dependability and durability that's unsurpassed by any other brand. And it offers a full one year warranty—the best in the business.

The new Spectrum LX-80 offers a combination of performance and value at a price that's second to none.

ALL NEW ONLY *Epson continues to set the pace in computer printer performance with. . .*

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EPSON FX-85 LIST $699



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Plus, for an added measure of creativity, Epson's exclusive SelecType feature gives you finger tip selection of numerous popular typestyles at the touch of a few buttons. Its easy control panel selector means less time programming when changing typestyles. The FX-85 is equipped with both pin feed and friction feed and connects to your computer by simply plugging in a cable. And with Epson's full year warranty you can be sure you're getting the most in quality, dependability and performance.

Get a hard working business printer designed to give you a powerful advantage in meeting the hectic, high-pressure demands of today's business world. . . get the FX-85!

LQ 800 & 1000



$Call and Save$

PRINT SAMPLE
- Letter Quality
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- Proportional
- Elite
- Condensed
- Expanded
- Condensed
- Double-Strike
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– 24 Pin – Letter Quality

The LQ-800 and LQ-1000 can print at a speedy 180 cps printhead speed in the high speed draft mode. A speed fast enough to put a typical length business letter in your hands in under 25 seconds. Or, for a finished professional look, switch to Letter Quality mode at 60 cps. The results will amaze you. Epson's advanced new 24 pin printhead assures superb resolution page after page. In fact, print quality is so superior to that produced by other dot-matrix printers, you'd think it came from a top of the line office typewriter. And for fast, efficient throughput, both print bi-directionally using intelligent, logic-seeking electronic systems. The smart way to put business on paper.

Whether you take one home, use it to help run a small to medium sized business, or use them in a corporate environment, the LQ-800 and LQ-1000 make excellent choices for virtually any printing task. You can turn out drafts at high speed, letter quality copy in seconds, or sharp, finely defined graphics. The 136 column LQ-1000 is ideal for printing spreadsheets and financial reports; while the 80 column LQ-800 can handle everything from correspondence to mailing labels. Both come with a 7K internal buffer that stores up to four pages of data allowing you to print and use your computer at the same time. Easily installed optional Identity Modules let you choose between Extended Epson Graphics, IBM Graphics Printer or Diablo 630 code. The kind of versatility a growing business demands. There are also built-in fonts and optional Font Modules for an array of easy to access font styles. The choice is yours.

NEW EPSON FX 286

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LIST $749

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Optimum Versatility:
- Print drafts at high speed; Near Letter Quality copies; and superb graphics.
- An 8K internal buffer allows you to print and use your computer at the same time.
- Exclusive SelecType feature delivers numerous popular typestyles at the touch of a button.

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Want to make sure those reports are understood? Why not try emphasizing your points with graphs and charts! The LQ-1500 can deliver charts and graphs beautifully!

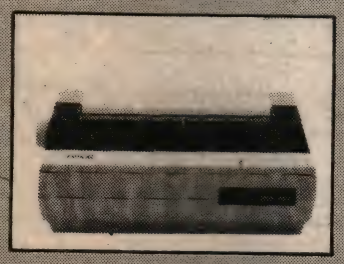
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We understand you have some questions. . . And **YES** *we have some answers. . .*

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DX PRINTERS
- Normal Printing
- 12 Pitch
- 10 Pitch
- Bold Printing
- Shadow Printing
- Underline
- Super and Subscript



Productivity is very important to us. How fast are the DX-10, CX-20 and DX-35?
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How versatile are the DX Series Daisywheel Printers?
All are ideal additions to any office or home computer system. And in business environments, versatility is often the key to greater success. Each has a Single Sheet Feed for printing letters and spreadsheets. With the DX-20, paper sizes up to 13 inches in width are accommodated. Plus, for the utmost in creative versatility, an interchangeable Diablo compatible print wheel gives you immediate access to a huge selection of English and international typestyles.

Will any Epson Daisywheel Printer work with the computer we now have?
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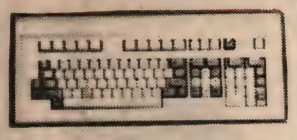
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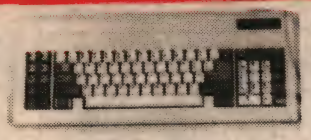
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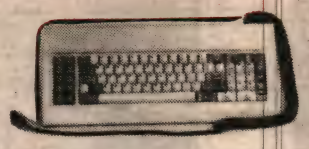


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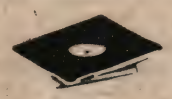
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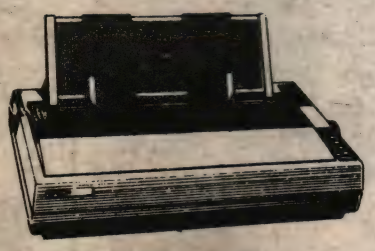
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KXP 1592 180 CPS, 38 NLQ, DOT MATRIX	CALL	CALL
KXP-3131 17 CPS, DAISY WHEEL	269.00	499.00
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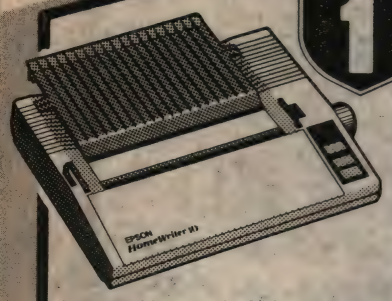
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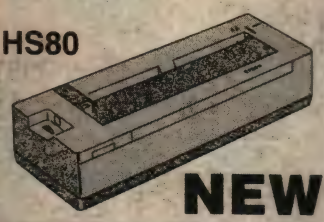
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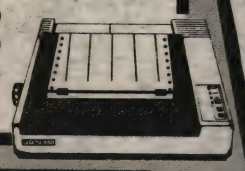
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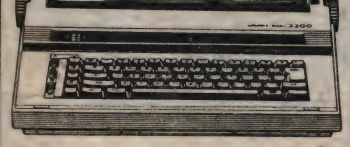
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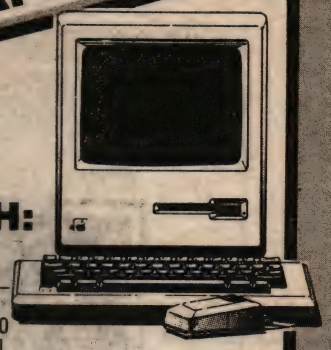
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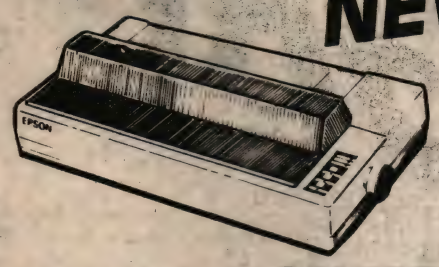
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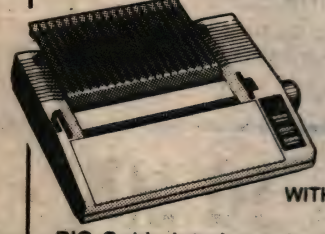
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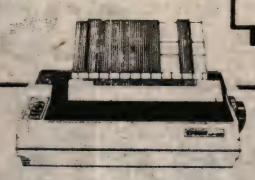


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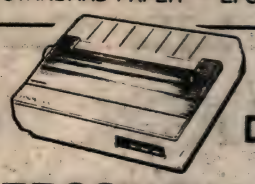
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INTERVIEW WITH THE GODFATHER:

WHY ARE YOU RUNNING THIS INTERVIEW INSTEAD OF AN AD?

Because we have been getting so many questions from *SHOPPER* readers requesting information about our organization, we needed to let you know who we are, what we are planning, and how much we have appreciated your support over the last two years.

WHAT IS THE SIGNIFICANCE OF THE GODFATHER NAME?

Originally, the "Godfather" was a man who helped others in the community, not the gangster who is now portrayed by Hollywood. We help our customers and they help us. From the start, we wanted to make it very clear that we would sell only super values and super products at prices that would be less than would be offered anywhere else. This limits the equipment offered, but we really get to know what we DO sell very well. We take seriously "AN OFFER YOU CAN'T REFUSE!" We say to our customers . . . if you can find a better deal, we'll either sell to you at that price, or tell you to get it at that price if it is in your best interest.

HOW DO YOU AND YOUR CUSTOMERS HELP EACH OTHER?

Other than the obvious values, we often will do research on compatibility problems, warranty claims, software, etc. Our Columbias are one of the best compatibles in the market, and we have sold tons of them, despite the fact that the company is folding. We have been selling them with a factory warranty, which has worked rather well with few exceptions. The exceptions we have repaired at our expense, even though Columbia was supposed to do the repairs. Now we have Bell & Howell doing the repairs, but we still coordinate repairs for the customer. We will continue to fully support the Columbias. Our customers help us in getting the information we sometimes are unable to come up with ourselves. For example, our Toshiba color monitors came with only 8 colors and we designed a 16-color upgrade but were never able to get it to work right. We had five customers that did find the answer, and one had it perfect! The modification instructions are available to any of our Toshiba customers, but it is not really easy to implement as it does require some parts, soldering, and adjustments.

HOW LARGE IS YOUR ORGANIZATION AND WHY ARE YOU SUCCESSFUL?

Right now we only have twelve people, but we do the work of many more by putting in an average of 55-60 hours a week. In addition to ourselves, we have dozens of store "regulars" and consultants that help us keep up with what is happening in the industry and help customers with difficult software or hardware problems. On a typical Saturday, the person answering the phone could be one of our customers helping out when we get snowed under! I would advise all of you computer buffs to find a store to help for free (if you can)! It will pay you back in ways you can't imagine! This is how we can usually solve almost any problem, given a little time.

WHAT HAPPENED TO YOUR NEW COMPUTER CALL THE "VIOLIN"?

We have had the computer finished since October. It looks and works great . . . with some exceptions. The first problem is that it will not pass FCC certification. We have chosen not to market a non-approved product. There are good engineering reasons for this. The radio emissions are high because the circuits have not been designed with the FCC in mind. In addition to the possibility of ruining Sunday's super bowl, these noisy circuits are sometimes picked up by other chips inside your computer . . . what's a few false bits in your root directory?!?! The reason your IBM or COLUMBIA is bolted together as well as it is, along with MANY other good design features you would not notice, is to meet FCC regs, AND to make it RELIABLE! It seems engineering out the noise also makes it almost immune to ELECTRICAL STATIC DISCHARGE. So DO NOT touch your NON-APPROVED CLONE on a cold day — you could give it the shock of its life!! We also did not want to have the FCC come to us and tell us to re-engineer units we had already sold, give them our remaining inventory until we re-engineered them, tell our customers we will have the problem solved soon, and THEN file for CHAPTER 7!! There was a major manufacturer that had a sidewalk sale last summer, sold equipment to customers who paid for the computers — only to have the FCC seize them instead because they didn't meet the specs!! Also, the GODFATHER doesn't like jail . . . Heh, Heh!!

AREN'T YOU BEING ACCUSED OF "VAPORWARE" NOW?

Better than "VAPORCOMPANY" and mad customers . . . besides, we're in good company — major companies have done it. Some computers should have stayed vapor! Actually, we are working on getting a good reliable approved unit to market. In the meantime, we are STILL offering some super deals on monitors as well as on our new EGA card that IS here at 40% off normal retail for $350. We should do well with the EGA card as it works the same as IBM's with some extra features. We believe IBM will have some interesting uses for this card. It will take the software houses to make it a mandatory option, though. We understand Windows and Gem supports this card now.

WHY DON'T YOU OFFER MORE USED EQUIPMENT?

We sell a lot of used equipment, but good supply is a problem. People do not want to face the fact that equipment is worth much less today than when they purchased it. It makes it seem as though they have made a big financial mistake. When someone sells us his two-year-old computer, he has admitted that he has lost a lot of money. That's why there are a lot of $3,000+ (originally) computers sitting in closets that we won't buy for $100 . . . and the public wouldn't pay $150 for, even with a full warranty and training!! Even the GODFATHER has been caught in this thought pattern. Anyone want to buy an Atari game machine for $200? We still own three!

WHERE IS FOREST CITY, FLORIDA?

In metro Orlando. When you visit MICKEY MOUSE, visit the GODFATHER. We have in-store specials often . . . like DSDD OPUS disks for $6 per box of ten.

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This one bothers me. Our Florida banks tell me that they will no longer allow any new banking customers to take "phoned-in" MC/VISA slips. Due to recent credit card fraud and fraud laws, as well as interstate banking regulations, EVERYONE suffers (the crooks make us honest folks pay!). We lose business because we cannot accept telephone credit card orders and you lose the convenience of ordering (however, remember you don't lose the 4% because you are paying by cash — it's an automatic discount!). We generally don't take CODs without a deposit, either. We have had customers order the same merchandise from three vendors and only accept one! Why should our customers have this cost passed on to them?

WHAT ARE YOUR FUTURE PLANS FOR GODFATHER'S?

We are currently working on a number of projects. Two of them involve some very new technology — one, hackers will love; the other, they will hate. Our franchise plans are still in the works, but we are not out to make money by just selling franchises. We insist that they MAKE MONEY and the fees will only come from profits . . . not selling someone on an idea, giving them a book, and saying good luck. Stay tuned, though, as we get more organized and have something to offer, we will be ready to help others do the same. We always welcome any suggestions for new products or services for our customers. We are particularly looking for neat little programs that make life bearable in the MS-DOS world. We had a customer who recently typed in "FORMAT" to format some floppys to do a backup of the hard drive . . . guess who had a blank hard drive?! We now have a program to prevent this from happening. If you know of any other useful programs — yours, public domain, or commercial software — please let us know. Just a suggestion — look at XTREE by Executive Systems. Everyone around here really likes it! We have some top programmers here to help us transform your terrific ideas (that haven't been done yet) into great software tools.

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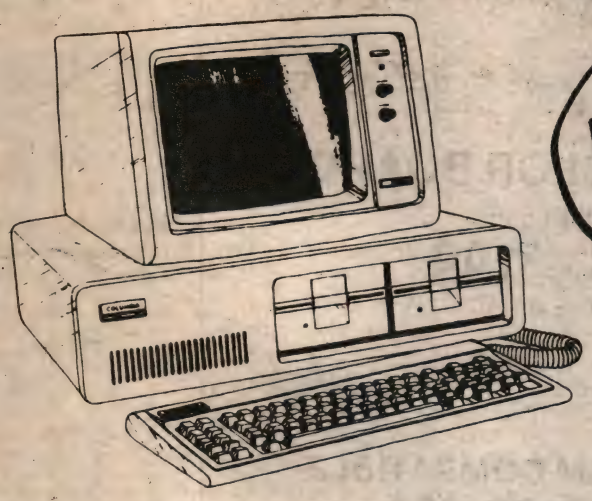
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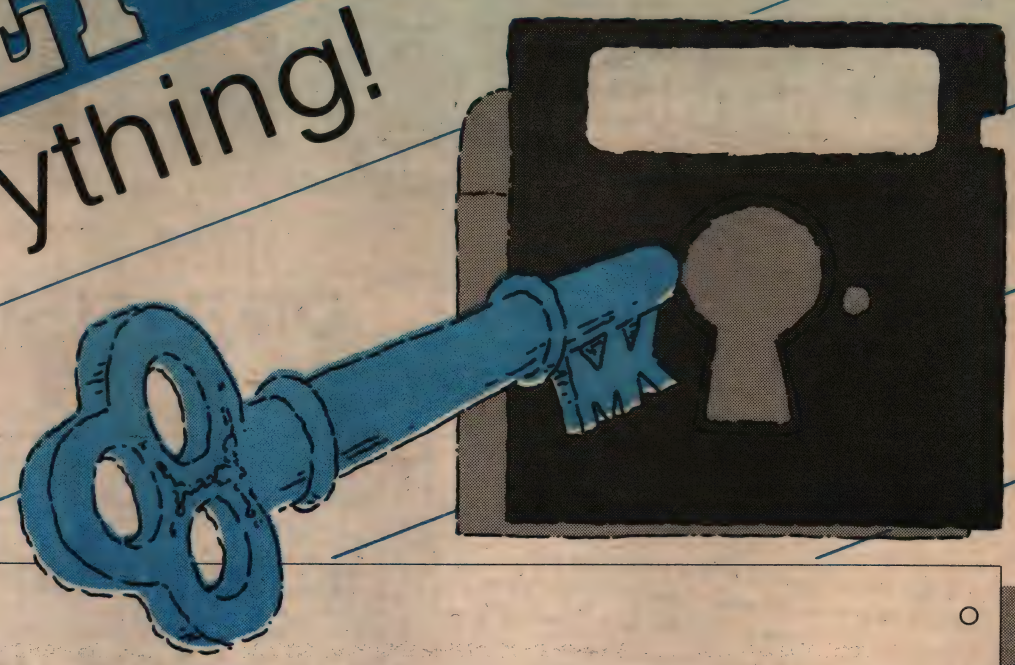


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```
A>DEBUG
-N PROGRAM.COM
-L
-D 100 129
33CB:0100  EB 0B 40 05 56 65 72 73-20 31 2E 38 31 50 B4 30   k.@.Vers 1.81P40
33CB:0110  CD 21 86 E0 3D 36 01 72-05 3D 0A 02 76 09 BA CB   M!.`=6.r.=..v.:K
33CB:0120  03 B4 09 CD 21 CD 20 58-EB 2F                     .4.M!M Xk/
```

turn this:

into this

instantly and automatically with a turn of **MASTER*KEY**!

Without MASTER*KEY, how long do you think it would take to find out this program wasn't running because you had the wrong version of DOS?

```
OFST  ASCII  OBJCODE      SRCECODE
                          ;Program:  PROGRAM.COM
0100         EB0B         H0100:  JMP    H010D
                          ;-----------------------------------------------
0102         40                   INC    AX              ;NON-BRANCHED CODE
0103  Ve     055665               ADD    AX,6556h
0106  rs     7273                 JB     H017B  ;. . . . . .
0108   1     2031                 AND    [BX+DI],DH
010A  .      2E                   DB     2Eh
010B  81     3831                 CMP    [BX+DI],DH
                          ;-----------------------------------------------
010D  P      50           H010D:  PUSH   AX
010E   0     B430                 MOV    AH,30h
0110   !     CD21                 INT    21h             ;get DOS Version#
0112         86E0                 XCHG   AL,AH
0114  =6     3D3601               CMP    AX,0136h
0117  r      7205                 JB     H011E  ;. . . . . .
0119  =      3D0A02               CMP    AX,020Ah
011C  v      7609                 JBE    H0127  ;. . . . . .
011E         BACB03       H011E:  MOV    DX,03CBh
0121         B409                 MOV    AH,09h
0123   !     CD21                 INT    21h             ;display string, DX
0125         CD20                 INT    20h             ;terminate normally
                          ;-----------------------------------------------
0127  X      58           H0127:  POP    AX
0128   /     EB2F                 JMP    H0159
                          ;-----------------------------------------------
```

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MASTER*KEY is an intelligent MS-DOS Disassembler. It produces easily readable self-documented assembly language segmented source files that can be edited with any ASCII file text editor or Word Processor then re-assembled using MS-DOS Debug, Assembler, or Macro Assembler and linked with other object modules if desired. It handles object code from the 8088, 8086, 8087, 80186, 80286, and 80287 processors. It decodes into MS-DOS 2.0, 2.1, 3.0, and 3.1 from **BOTH** COM and EXE files.

MASTER*KEY includes a Source Code Formatter and Cross-Reference Generator. The Formatter produces a documented source listing identifying all ROM BIOS and DOS Functions and Interrupts. It serves as an object code optimizer by helping to identify stack areas, temporary storage, ASCII strings, and unnecessary code. The Cross-Reference identifies the number and location of all labels, symbols, functions, and interrupts.

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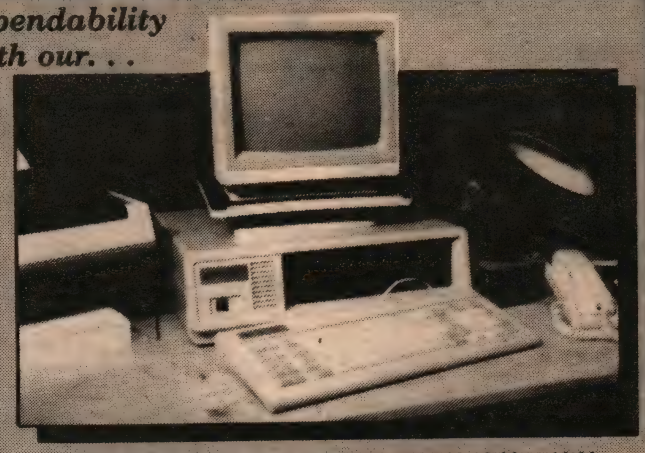
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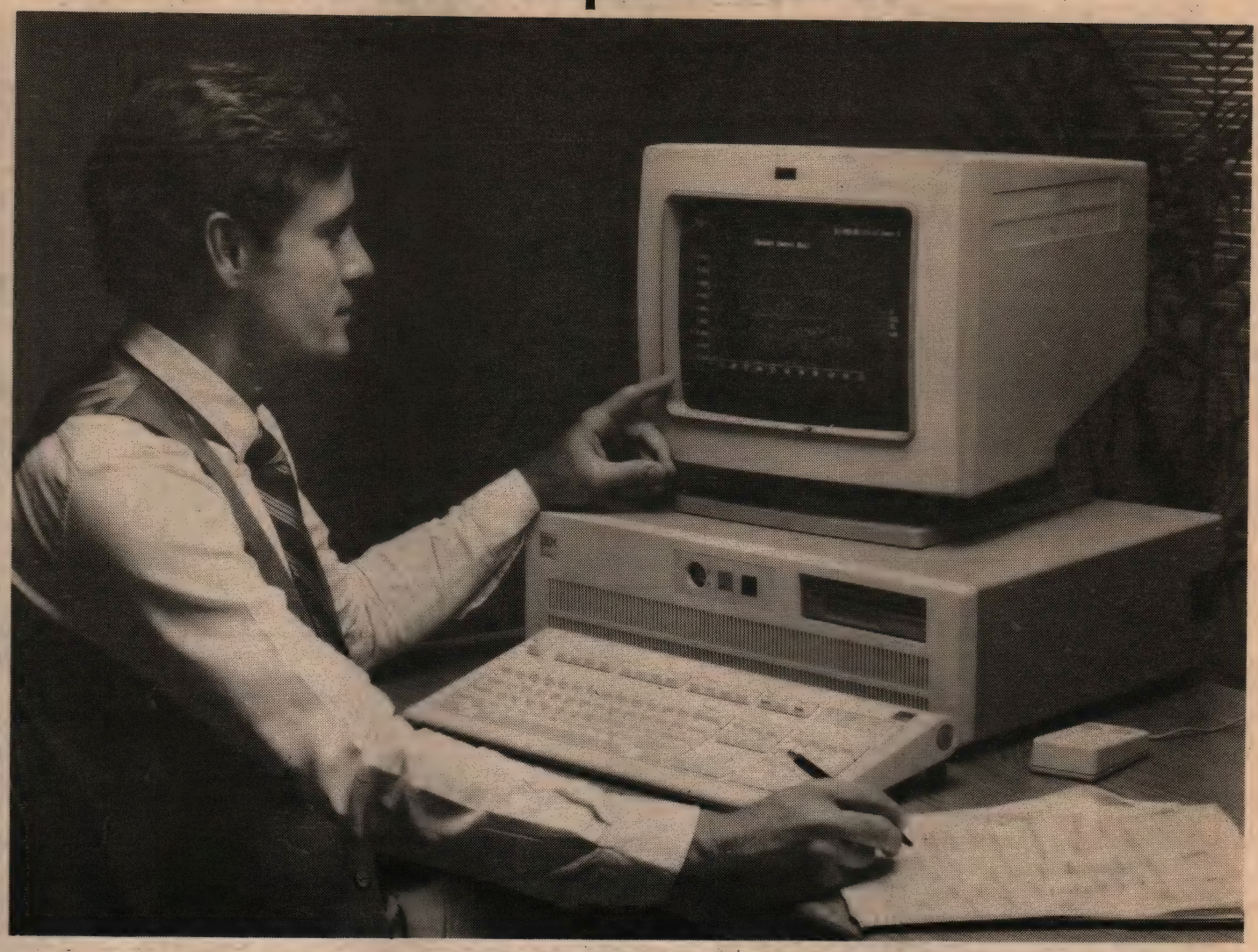
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IBM-MS DOS

Mainframe-On-A-Desk
IBM RT PC 32-Bit Super-Micros

by Rich Fields



IBM RT PC 6150 Model 10

When IBM developed the PC family of MSDOS computers they operated in a manner different from their corporate culture in many ways. First they allowed a company division to act as an "independent"entity in the design, production, and marketing of a new product line. Second, they produced a computer made of components not produced and controlled within the IBM company. Third, they built a machine with an open bus that could use expansion boards made by third party vendors. Fourth, they used an operating system and high level languages produced by outside vendors. The open DOS and language software led to a massive development of independent application software.

The net result for the computing community was the PC revolution we have all been a part of during the past few years. It has, also, led to the universal acceptance of the second generic computer family - the PC/XT/AT MSDOS computers.

No one who reads the ads and articles in magazines can deny that the IBM PC/XT/AT computers have evolved into a generic family through cloning. But why do I claim this to be the second family of computer clones? Because the first generic computer family was the 8-bit, Z-80 based, CP/M operated computers that preceded the 16-bit 8086/8088 MSDOS computers and that showed the world what personal computers could do.

IBM has given the world the PC family and has legitimatized the victory of the personal computer over the minicomputer. In doing this, IBM has found its own orderly world of mainframe computing and its customers, who are the corporate DP departments, threatened by the personal computer. IBM has done everything it could to integrate this maverick computer into the mainframe network and to restore the primacy of the DP Department. But the PC/XT/AT resists such integration because of its different operating system, speed, application software, and its very concept. The very name, "personal computer" means a stand-alone computer operated by one person, even if it is part of a network of other such computers. Calling it a "workstation" does not make it one, because a"workstation" implies a less intelligent terminal dependent upon a mainframe for its computing power.

All of this is to introduce IBM's solution to this dilemma, the new family of 32-Bit RISC (Reduced Instruction Set Computers) called the IBM RT PC computers. These new machines, the first to be based upon the IBM-invented RISC architecture, will provide to those willing to spend $11,700 to $19,510 the ability to perform such tasks as Computer-Aided Design (CAD/CAM) and Computer Aided Engineering (CAE), usually done by large computers. The new IBM 32-bit Research/OPD Microprocessor (ROMP) chip that makes this possible allows the RT PC to handle data at the super high speeds required to directly communicate with modern mainframes. When used with IBM's new virtual memory management chip, the RISC chip can access one trillion bytes of memory, more than large mainframes can address today. The result will be to allow RT PC systems composed of one RT PC and seven ASCII workstations to operate without regard to the size of their programs or memory.

The IBM RT PC can use the new $3,400 operating system software called Advanced Interactive Executive (AIX tm.). This system combines the multi-user, multi-tasking features of UNIX, with IBM-developed enhancements that make it easy to use. It can also address one trillion characters of virtual memory.

Among the RT PC features are application software development tools and architecture that are open for others to develop additional software and hardware applications. IBM has and will continue to work with third party developers who are interested in developing products for this new environment.

IBM has not turned its back on the existing PC/XT/AT family; the RT PC can also be IBM PC compatible. The addition of an optional $995 PC AT co-processor card and a $550 co-processor program permits many existing PC programs to run concurrently with RT PC programs and to share RT PC disk files and displays.

The new RT PC line consists of several models:

*The IBM RT PC 6151 Model 10 (shown on the cover) is a desktop unit similar in size to the other IBM Personal Computers. It comes with one megabyte (1 MByte) of RAM memory (expandable to 3 Mbyte) and 40 Mbyte of hard disk capacity. A 101-key adjustable keyboard that can be used for many applications, including numerical data analysis, graphics, and text, is also standard with the Model 10.

*The IBM RT PC 6150 Models 20, 25, and A25 are floor standing units that fit under a desk and can be used either as stand-alone computers or as host processors for an attached IBM 5080 Graphics System.

The Model 20 comes with 1 Mbyte of RAM memory expandable to 3 Mbytes and 40 Mbyte of hard disk storage expandable to 180 Mbyte.

The Model 25 and A25 come with 3 Mbyte of Ram to 4 Mbyte and 70 Mbyte of hard disk expandable to 210 Mbytes.

Models 20 and 25 come with the 101-key keyboard, and when attached to the 5080 Graphics system, use the 5080 keyboard. Model A25, designed only for use with the 5080 System and keyboard, comes without the 101-key keyboard.

To supplement the new computers, IBM announced new peripherals at the same time:

There is a choice of all-points-addressable graphics displays. The IBM 6153 Advanced Monochrome Graphics Display is a 12-inch unit with 720 by 512 pixels. The IBM 6154 Advanced Color Display is a 14-inch color monitor with 720 by 512 pixels. The IBM 6155 Extended Monochrome Graphics Display is a 15-inch monitor with 1024 by 768 pixels. The RT PC computers can also use the current IBM 5151 PC Display and the 5154 PC Enhanced Color Display.

The IBM 6157 Streaming Tape Drive

continued on page 42

Mainframe
continued from page 41

is a backup storage device that provides users of both RT PC and System 36 computers with a fast way of backing up hard disks. The new unit stores 55 Mbyte of data on 1/4" tape at data rates up to 5 Mbyte per minute.

The IBM 6160 is an eight-pen color plotter design to produce high resolution engineering drawings, graphs, charts, and diagrams on standard sized transparencies and paper. This unit attaches to most IBM PCs and to the 5080 Graphics System.

The IBM 5083 Graphics Tablet, Model 12, permits CAD/CAM designs to be modified quickly, providing precise movement of the screen cursor in any direction. This tablet is priced at $575.

The system is also provided with an optional 32-key lighted keyboard with function keys that are operable during program sessions. The entire bottom of each key is illuminated so that users can view keys easily.

The New Romp Processor Chip

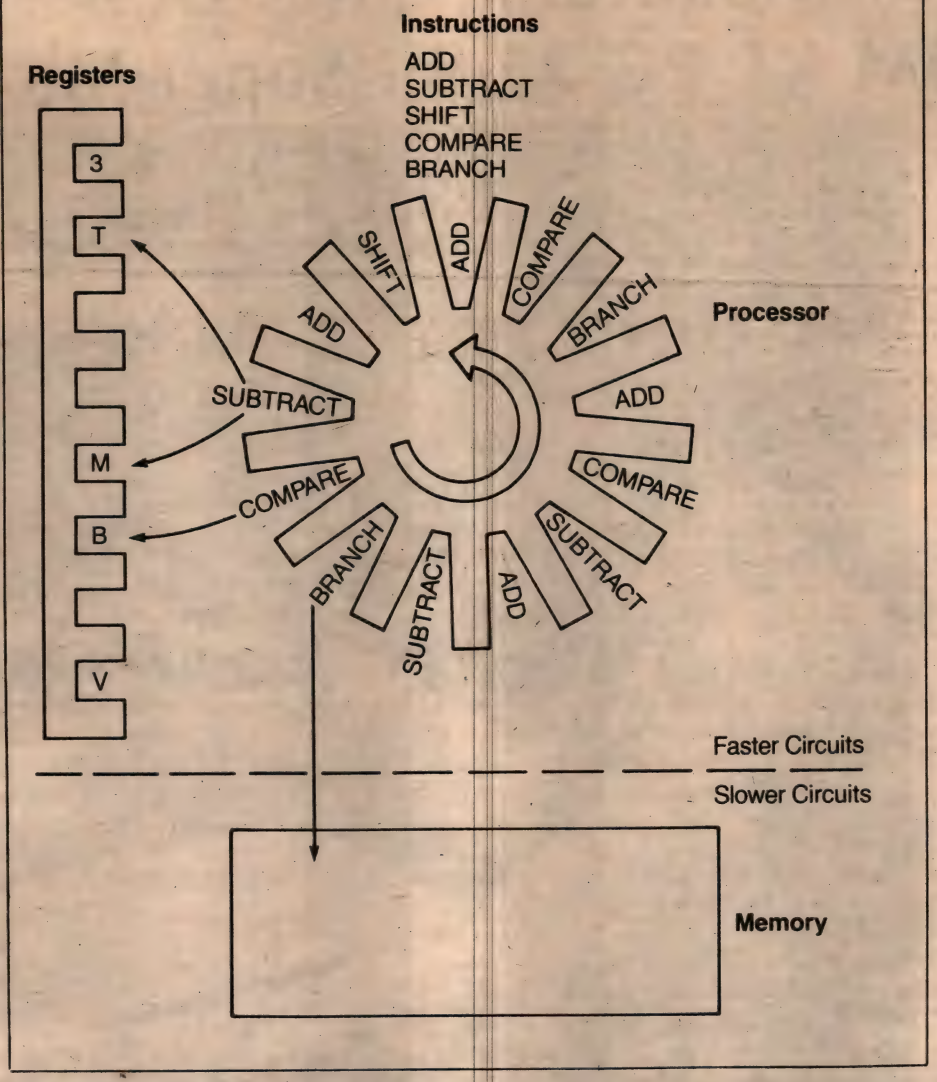
The heart of the RT PC computers is the new 32-bit Reduced Instruction Set microprocessor known as the IBM Research/OPD Microprocessor (ROMP). This CPU Design was the result of early IBM research that lead to the development of the IBM 801 processor in 1980. The RT PC processor is a single-chip derivative of this design. The RT PC chip adds special features that extend the RISC architecture to provide increased efficiency in a microprocessor environment.

The usual microprocessors used in PCs are designed to be computers-on-a-chip, executing complex computer functions within the processor. The instruction set is the built-in program that directs the operation of the processor chip. The number and complexity of the instruction set is thought of as the power of the chip. The execution of more complex instructions require many time cycles of chip operation. A 32-bit instruction set can execute more complex instructions than a 16-bit or 8-bit instruction set and in less time. The CPU chip receives its sequence of instructions from the memory of the computer.

The RISC microprocessor is built on a different principle. It has far fewer instructions, and they are of a less complex nature. Simple short instructions are used, and most of them can be executed in only one machine cycle. The ROMP has 118 instructions, sixteen 32-bit general purpose registers, and a full 32-bit data flow for both addresses and data. Most register-to-register operations execute in one 170 nanosecond cycle. Performance is typically 1.5 to 2.1 MIPs (millions of instructions-per-second), depending upon the instruction mix.

Memory Management Unit MMU)

While the RISC processor executes its instructions much faster, it does require many more memory accesses. And the memory chips used are normal 256K-bit chips operating at 150 nanoseconds. The RT PC, therefore, uses a special Memory Management Unit (MMU).



RISC TECHNOLOGY: This simplified schematic shows the basic economy of operation of IBM-invented Reduced Instruction Set Computer (RISC) architecture. The original RISC prototype computer, called the 801 Minicomputer, was built at IBM's Research Division in 1980 — the result of a project that began in the 1970s. Simple, short instructions, most of which can be executed in a single processor cycle, are fed into the processor, symbolized by a gearwheel. Each space in the gearwheel represents one machine cycle and the short instructions delivered into the processor fit neatly into each cycle.

The processor also efficiently swaps data between registers, left, and so reduces the number of accesses to memory. RISC machines tend to be characterized by a large number of general-purpose registers. Because of these attributes, most of the machine's work is carried out in the faster "upper" circuits that make up the processor and registers.

The end result is that each cycle is "occupied" with something to do, and there are fewer things exchanged along the longer, slower path to memory.

This chip is mounted on the same processor board as the CPU and plugs into the system board. The MMU converts the 32-bit system address into a 40-bit (1 terabyte) virtual address for translation. Internal translation buffers within the MMU convert the 40-bit virtual address to a 24-bit (16-megabyte) real address. The MMU also can automatically reload the translation buffers from main memory page tables as required. The MMU also contains the memory control logic and the power-on self-test ROM. As an option, the processor card can use a Floating Point Accelerator (FPA).

The system contains two dedicated slots for memory boards. These are attached to the system bus through the memory channel, which consists of a 40- bit data bus and a 24-bit address bus. The data bus includes 32-bits of data and 8-bits of error correcting code (ECC). The RT PC ECC allows automatic detection of all single-bit memory errors and detection of all double-bit errors. The 24-bit address bus is capable of directly addressing up to 16-megabytes.

The system board contains all of the functions needed to adapt the RT PC to a PC AT-like I/O channel. A DMA controller and a real time clock are also provided on the system board. A separate microprocessor is provided to handle the system keyboard, speaker, mouse, and tablet interfaces. Two RS-232 ports are provided with DMA capability for attaching terminals, printers, or other I/O devices.

An optional intel 80286 co-processor card plugs into an I/O channel to provide compatibility with the IBM PC/XT/AT computers. This can also contain the 80287 math co-processor.

System Operating System

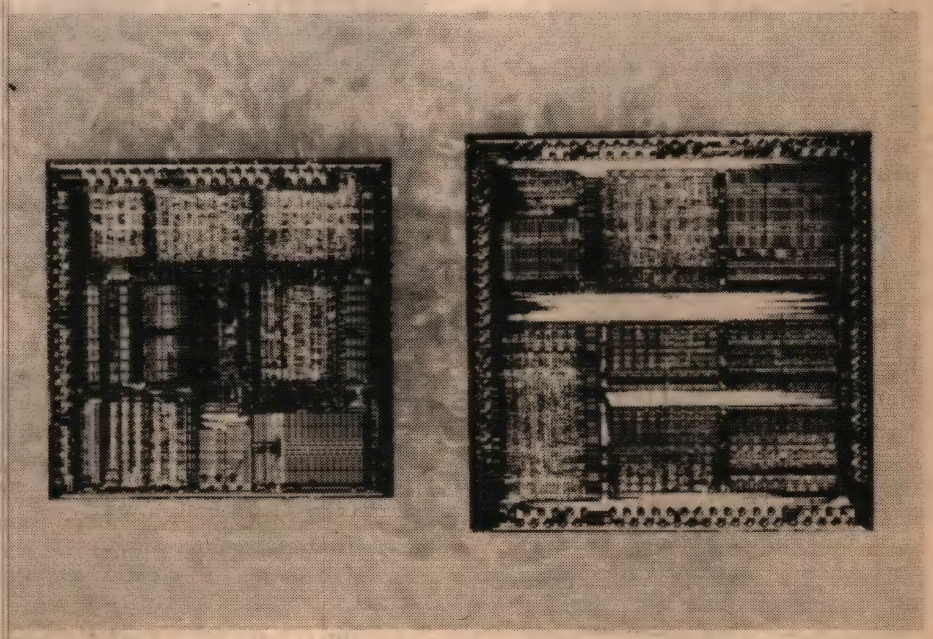
The software operating system for the IBM RT PC has a layer between the OS and the hardware, similar to the BIOS used in the PC computers. This is called the Virtual Resources Manager (VRM). It controls the real hardware of the machine in such a way that it provides a high level of hardware independence and conceals the complexities of virtual memory management and numerous I/O device types. It allows complete device transparency and I/O redirection. The VRM is, in effect, a higher level machine that guest operating systems can be converted to.

Aix Operating System

The IBM Advanced Interactive Executive (AIX) is based upon AT&Ts UNIX V, with extensions suitable for the RT PC. Although there are more recent versions of UNIX, IBM chose UNIX V because there are more applications for it than for other versions. Some of the major extensions and enhancements made were:

A Useability package (Shell) to provide easier access to the capabilities of UNIX and to simplify the implementation of full-screen dialogs. Multiple full-screen virtual terminal support (windows) to permit a user to run several interactive applications concurrently, time-sharing the console display.

continued on page 76



Shown here are a 32-bit microprocessor chip (the smaller chip) and a powerful new logic chip called a "memory management unit." This two-chip set enables the IBM RT Personal Computer to handle data at the high speeds required for complex technical applications. Manufactured here using an NMOS process technology, the chips are among the first 32-bit chips to enter full-scale production anywhere.

ATARI ST

Double Your Memory Double Your Fun

by W. Krieger & W. Rostek

When you first get your Atari 520ST, 512K of RAM seems to be more than enough. Think about it, most people are upgrading to an ST from an 8-bit machine with 48K or, in some machines, 64K. Even if the TOS operating system takes up over 200K, that still leaves a lot of free RAM, far more than the 64K you may have been accustomed to. Atari is now shipping TOS in ROM which, when installed, will free up another huge chunk of RAM in the ST.

So, why would anyone in their right mind want to add more memory? Well, one of the truest laws of computers states that there is never too much RAM. The major advantage of having lots of RAM, is in having lots of speed. Access time to acquire data or programs stored in RAM is several orders of magnitude faster than reading that some information from a floppy disk.

Also, programs tend to grow to fill all available memory. In the early days of personal computers, an 8K Basic was a large program that left little room for the application program. Today people are using 64K Basics, and there seems to be no end to the growth. The large amount of memory in modern micros allows programmers to create programs with features and capabilities that would have been impossibe on earlier machines. It seems that the more memory you have in a system, the more you want.

ST owners are very lucky in this regard. We start out with more RAM than most machines, and there is a very inexpensive way to double the existing RAM. The Memory Management Unit, (from here on out referred to as the MMU) on the ST was designed to handle two banks of memory chips. The 520ST only has one bank of chips installed, so all you need to do is install a second bank of dynamic RAM chips, and bingo, you have a one Meg ST.

While this seems simple on paper, actually adding the extra RAM is a little tricky. Atari never designed the 520ST as a one meg machine. **Editor's Note: This was written before the announcement of the 1040ST.** There is no room on the circuit board for the second bank of chips, and there no expansion slots to add more boards. The way to get around this is to piggy back the second bank of chips on top of the existing bank, and fly-wiring the RAS (Row Address Strobe), and CAS (Column Address Strobe), lines to the proper pins on the MMU. All the other signals and power are common to the RAM chips in the original bank of memory.

WARNING

Before going into the step-by-step instructions, we must warn you that this modifications will VOID YOUR WARRANTY.

More importantly, it's very easy to kill your machine if great care is not taken. *Computer Shopper*, or the authors are not responsible for any damage you do. If you don't have extensive soldering experience, don't try to do this mod. We have seen three people kill their STs trying to install the extra memory. In all cases the owners were able to get the machines back in running order, but only after a lot of testing and a lot of extra work. If you do decide to add the extra memory, please read this entire article before you start.

To get the photos and some firsthand instructions on installing the memory mod, we contacted Gary Mckinney of the ST User's Group. Gary has been upgrading STs for User Group members for some time now and has the best track record of successful mods that we have found. His electronics experience is extensive; he has been certified to work on U.S. spacecraft.

O.K., lets get down to the nitty-gritty. You decided you want to do this, and you are confident of your ability to do the job. The tools (See Figure 1) you will need are:

1. A good quality soldering iron with a small tip, preferably temperature controlled. If you can't get a temperature controlled iron, don't use anything larger than a 25 watt iron. A 15 watt iron is better.
2. Thin rosin core solder. The thinner the better.
3. Sixteen 256K 150ns RAM chips. We used NEC 41256C-15s, and had excellent luck with them.
4. An antistatic mat, or a couple of feet of aluminum foil.
5. A desoldering tool or desoldering wick and a solder sucker. The best thing for unsoldering an ST appears to be a desoldering iron from Radio Shack that has a built-in bulb.
6. A couple of feet (4 or 5) of wire-wrap wire. If you can get three different colors, it will help.
7. Phillips screwdriver, long-nosed pliers, wire stripper, tweezers, etc.

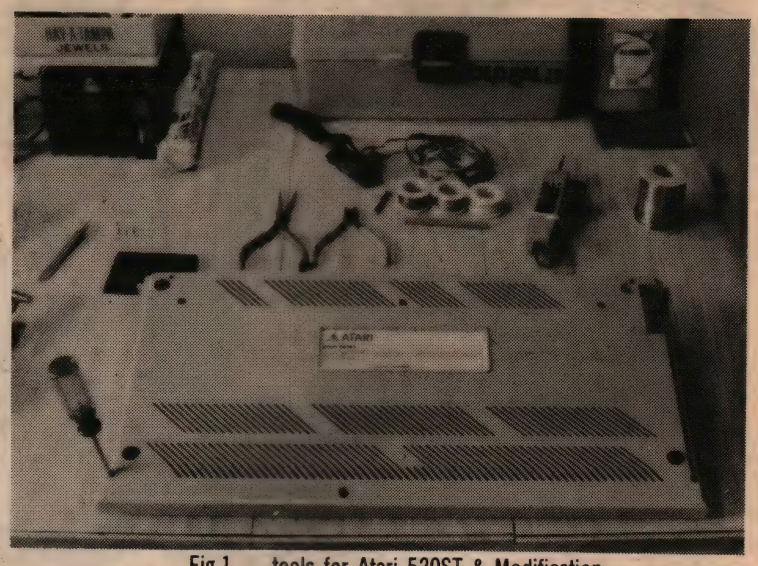


Fig.1 — tools for Atari 520ST & Modification

You don't need to have a logic probe if the modification works on the first try, but if you have problems, it helps to pin down where things went wrong. We recommend that you don't try the mod unless you have a logic probe on hand or can get one if needed.

Step #1

Prepare a clean, well lighted work area. Give yourself plenty of room to work. You will need more light than you normally use because of the close quarters on the ST PC board. Lay out the tools and be sure you have everything before starting. A word of caution about the new RAM chips you just bought, don't take them out of the shipping tubes until you need them. When you do get ready to use them, take proper precautions against static electricity; the 256K RAM chips can be destroyed by static electricity. We have been buying our chips from Microprocessors Unlimited Inc. who

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That Dangerous Thing — A Little Learning

by Frank Tymon

Introduction

A little learning is a dangerous thing -- or so goes the old saying. But there is one thing even more dangerous. That is ignorance. With this routine I'll try to dispel ignorance, hopefully without introducing danger.

The 520ST BASIC program included with this article is a simple example of computer aided learning. The latter consists of a variety of routines, of which this is but one type. This routine assists the user in learning anything of interest to him. He can use pre-generated learning packages, or he can develop and tailor packages of his own.

A picture may be worth a thousand words, but for the computer enthusiasts hands on use is of even more value. In the following paragraphs we'll walk through a typical sequence of devleoping a learning package and using its contents. The pattern can be readily repeated to produce a tool for helping you learn anything from arithmetic to zoology.

TYMON'S TUTOR, A Computer-Assisted Learning Program

Lacking a better name, and being a little short on imagination, I've tagged this masterpiece with the title, Tymon's Tutor. In its own way it does act in the capacity of a private tutor. It teaches you those things you don't know, while giving you the opportunity to periodically review other exercises. As a result you both learn and retain what you have learned.

Tymon's Tutor (or T'T' for short) is a powerful tool for the student, whether in school or learning on his own. Early versions have been used by students throughout the United States, including those in the islands of Hawaii, in academic halls such as Stanford, and in the average high school. It originally ran on the old Trash 80 (A users' term of endearment for the first widely available home computer, the amazingly capable Model 1 Radio Shack TRS-80). A version has been used on the IBM PC. The Jackintosh version takes advantage of the 520ST capabilities to provide an even more powerful, yet user-friendly product.

The Hard Part

The program is rather extensive, and the hardest part in its use is keying it into the 520ST. It is, however, divided into logical segments, and with care they can be correctly entered. Once this hard part is done the rest is gravy. Or, to use some substitute cliches, you are uptown, you're living high on the hog, and from now on its all downhill.

Running Tymon's Tutor

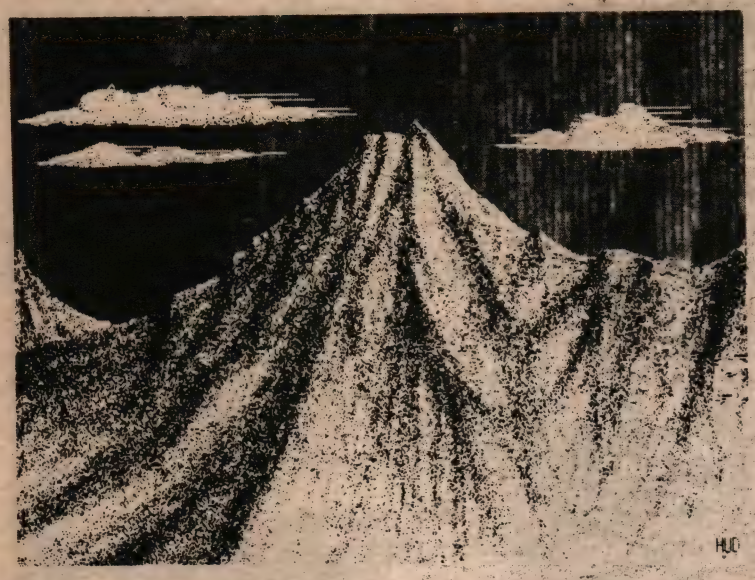
The following steps get you up and running.

1. Bring up your system
2. Load ST-BASIC
3. Enter load "tutor.bas"
4. Enter Run

(The program will set all screens to full, and clear them. At that point it will prompt you for a series of entries leading you to the desired result. The following steps use engrec.dat an English Vocabulary file-to illustrate use of

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The Artistic Atari



by W. Krieger

How many times have you seen a graphics demo on the Atari ST and said to yourself, "Gee, I wish I could do something like that." Well, now that DEGAS is out, you can DEGAS, what's DEGAS? DEGAS is a new program for the Atari ST. It's also an acronym for Design & Entertainment Graphic Arts System; hence the name DEGAS. **(Ed Note: DEGAS is also the name of the impressionist artist.)**

Let me quote Tom Hudson, the program's author, on what the program was designed to do."My purpose in writing DEGAS is to provide an easy-to-use interface that will allow you, the user, to create pictures, diagrams, charts, and so forth with a minimum of effort." Mr. Hudson did a good job, DEGAS is a great program, it's powerful, easy to use, it works in all three resolutions, it's inexpensive, only $39.95 and, best of all it's fun.

Lacking any great artistic talent I decided to first try DEGAS to make up some graphs and charts for a report I was writing. Not bothering to read the manual, I booted up the disk and was presented with a menu of options arranged in columns of boxes, containing lots of interesting things like eraser, draw, point, line, circle, box, text, airbrush etc. But what did he mean by K-line, X-ray-text, mirror, polygon, and a few other cryptic little boxes? Well, if all else fails read the directions.

One of the first things in the manual was a warning to make a back up copy of the disk and put the original in a safe place. In my opinion it's always a good sign when a program isn't copy protected. It shows the company gives some consideration to the user.

The manual is very easy to read and quickly answered my questions as to what all menu options were, how to use them, and gave a few hints and tips on getting the most from the program. All and all, one of the better software manuals I've run into, not too much detail, but enough to answer most of my questions.

The main thing to keep in mind while working with DEGAS is that there are two screens. One is the menu screen where all options such as color, drawing tools, etc. are picked. The other is the working screen. You switch back and forth by clicking the right mouse-button and you must access the menu screen to change any options. This system works a lot better than it sounds. Though it's a bit of a pain to leave the drawing every time you want to change tools or colors. It is really nice to have the whole screen for drawing. The switching to and from the menu screen is very quick and after a short time working with the system it becomes second nature.

All right now that I had a better idea of what was going on it was time to get back to the project at hand. The first thing I wanted to do was to work up a graph. Simple enough, DEGAS has 38 predefined fill patterns that can fill any enclosed section of the drawing, or the whole screen, and another 30 some odd fill patterns supplied as disk files. All I need to do was find a grid pattern and fill the screen, then draw in my axis and plot my points.

Bringing up the menu screen I put the mouse pointer on the fill pattern box and by clicking the left button, cycled through the available patterns. Not seeing a predefined grid that I liked I decided to overlay a pattern of vertical lines with one of horizontal ones. This worked fine and gave me my basic grid to work with.

The other way this could have been done would be to use the design fill option to make my own fill pattern. This opens a window on a 16 by 16 grid, used to make your custom fill pattern. Each square in the grid represents one pixel on the drawing screen. The boxes can either be turned ON or OFF by clicking the mouse when the pointer is in the box. Custom patterns can be saved on disk for future use.

Now that grid was in place, I needed to draw in my axes and label them. Back to the menu screen to select the line option, change the working color from the red used for the grid to black for the axis. And use a thicker brush shape so they stand out. DEGAS has 15 brush shapes to choose from, and you can design custom brushes the same way as fill patterns. The line feature lets you pick the starting point of the line then stretch it out to where it should end then click the mouse and the line is drawn.

If you get the line in the wrong place just hit the UNDO key. UNDO erases the last change you made in the drawing, not just the lines, but any of the drawing options. As long as you haven't switched out the drawing screen between making the mistake and wanting to UNDO it.

DEGAS has excellent text features used to label the axis. The user can choose between different colors, and the sizes of text and the program comes with a custom font editor. This allows you to design any type-font you like. I really like the computer font supplied on the disk, because it prints really well on a dot matrix printer, and without the jagged edges most enlarged fonts give you.

Once the basic background is set up all you need to do is to plot your points, connect them, title the graph, and it's

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Control GEM From Jackintosh BASIC

by Frank Tymon

Jackintosh BASIC's most advanced feature--accessing the GEM graphic capabilities--provides immediate graphic power to the home computer user. The few instructions highlighted in the *ST BASIC Sourcebook* only indicate the potential activities that can be performed. You have seen only the tip of the iceberg. Read on, and you'll realize the extent and value of this option.

Introduction

There are a few instructions (in the text cited above) that arouse your interest in the other possibilities that exist. In the following pages, I'll look at these instructions. *The Sourcebook* provides simple programs to illustrate their use. Unfortunately, these have only meager comments. They allow you to perform a given action, and that is all. I'll explain these routines in depth and show how they can be extended to permit even greater use of GEM.

Additionally, I'll provide some representative programs which exercise GEM through the BASIC interface. However, the programs are only specific examples of extended capabilities. To acquaint you with the alternatives, I'll also develop a matrix of GEM functions against the parameter values that support their use. With this matrix you'll quickly find that drawing a given figure, filling it with a specific color, and modifying it--all using established GEM functions--is a straight forward activity.

There are a few BASIC language reserved words that apply to GEM access. These include gb, vdisys, gemsys, and systab as the primary ones. I'll examine how these allow you to take advantage of GEM, and more specifically the GEM Virtual Device Interface (VDI). This serves as the entry into the GEM graphics.

Well, enough of telling you what I'm going to tell you. Let's move on and find out how to drive GEM, with BASIC language programs.

Doing It

Reading and discussing an idea can be both entertaining and educational. Applying the idea, however, is essential if you want to truly understand the concepts involved. For that reason I'll start off with an actual program. It will draw a simple graphic object and color it internally. The program and a depiction of the drawn object appears on the following pages. Let's examine the code and determine how the picture was drawn. Then we'll analyze the situation and find out how to build on our limited knowledge.

The Circle

For simplicity's sake, let's start off with the circle generator provided in the *520ST BASIC Sourcebook* on page C-156. The program given illustrates what can be done with the GEM system and establishes a pattern that can be extended. I have modified the original program slightly to center the circle on the screen and to enlarge it. See figure 1 and program on page 180.

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Bridge 4.0 For The Atari 520-ST Computer

Artworx has begun its commitment to support the Atari 520-ST computer with the release of BRIDGE 4.0, the popular bridge-playing program that has been available for the IBM, Commodore 64, Atari, and Apple computers. The Atari 520-ST version of BRIDGE 4.0 takes full advantage of that computer's graphics and mouse capabilities. The user never has to touch the keyboard and will find that the cards are displayed just as they would appear on a real bridge table. All bids and card selections are performed by pointing and "clicking" the mouse.

BRIDGE 4.0 for the Atari 520-ST retails for $29.95 and is configured for both the black and white and color monitors.

For further information write Artworx Software Company, Inc., 150 North Main Street, Fairport, NY 14450, or call (800) 828-6573 or (716) 425-2833.

Mention that you read about it in *Computer Shopper*. ●

ATARI

Applying The Atari

by Jeff Brenner

Still puzzled over how March's *PixMix* program works? This month we'll take a look at the machine language routines essential to this program's operation. We'll also enter a program that gives us a disk-based BASIC language (and fixes up Atari's Revision B BASIC to boot!). And, for all you CX-85 numeric keypad fans, this month's column presents a special keypad driver that lets you use the keypad with some commercial software.

Did You Say 1040ST?

The Atari 1040ST should be in stores by the time you read this. Reaping the benefits of falling RAM chip prices, the 1040ST is an Atari 520ST-compatible computer with 1 megabyte (a megabyte is a million bytes) of memory, standard. Th ebig news is, of course, the price: $999 suggested retail, which includes a monochrome monitor and an internal disk drive.

The 1040ST is essentially a 520ST with an additional 512K RAM. 520ST owners can get equivalent power by getting any of the 512K upgrades that are available (see article in this months *Computer Shopper*.) A few design changes have been made in the 1040ST: The case is deeper, since the disk drive and power supplies are internal. The internal disk drive is double-sided, and an RF modulator is built-in (for using the ST with a standard color television). Additionally, the operating system (TOS) has been completed and (hopefully) fully debugged and is now in ROM. This eliminates much of the boot-up waiting time, since TOS no longer needs to be loaded from disk. The newer 520ST models now contain TOS in ROM also. (Incidentally, the TOS ROM chips are currently being installed at Atari service centers for 520ST owners who presently boot TOS from disks.)

The 1040ST may prove to be the most serious threat to the Apple Macintosh yet. The standard 1M RAM (say goodbye to Ks) combined with a hard disk (to be released soon at under $700) gives this machine enormous potential for serious business applications. Atari may have still even greater plans for reaching the upscale markets; sources say Atari is investigating the user of National Semiconductor's 32-bit "superchip," the 32332, in a personal computer.

Reader Mail

Dear Jeff,

In the January 1985 column you had a short disk directory program that I've relied on ever since it was published. I put it on all my disks along with an AUTORUN.SYS command that boots the directory program. Eventually I was having trouble on a couple of my disks, because they contained as many as 20 or more short utility files. When the directory program booted and ran on power up, it displayed all the files, but the first few scrolled off the screen (I had to be quick to read them).

To solve this problem, I made a few small changes in your original directory program. Now when the program is booted on power up, or run from BASIC, it displays the disk files in two columns, instead of just on the left hand side of the screen. After it has listed the file names and free sectors, the program asks "RUN AGAIN (Y/N)?" If you press the "Y" key and hit RETURN, the program will prompt you to insert the disk (use only drive one) and press RETURN. When you do this, the screen clears and the program reruns, displaying you files in a double column.

If you answer the "RUN AGAIN" prompt with the "N" key and RETURN, the program erases itself from memory and leaves the file directory on the screen. I find this especially handy as a boot-up program, because it leaves me a list of disk files in plain view to reference when I type in my LOAD, ENTER or RUN command.

Keep up the great work and I hope this program will be of help to your other readers.

Nicholas J. Worth
Heber, AZ

A. I'm sure many readers will appreciate your modification. A holographic sticker is on its way to you for your contribution.

Those readers who want the directory program to RUN when a disk is booted, use the SETUP.COM utility on DOS 2.5 to automatically run a BASIC program utility. See program 1. Next month I'll print a short listing that creates this AUTORUN.SYS file.

Dear Jeff,

One thing I do about *Computer Shopper's* microprint listings is to enlarge them to legible size on an enlarging photocopier (lots of them around.) This also works well for visually impaired folks, by successively copying the enlargement to a size they can read.

Paul Sentner
Pittsburgh, PA

A. Great idea! thanks for sharing it.

Dear Jeff,

We've developed a design for business software that differs from traditional designs in two ways. First, it meets a list of objections we compiled from a survey of operators of small businesses who had investigated computers but were not presently using one. Secondly, because we eliminated many features which were of no value to this group, all design specs are increased dramatically — application speed, functions, flexibility, friendliness, and especially capabity. We developed the design to sell to software developers and manufacturers. Because of it's low cost, availability, and to prove the design would work on any system, we chose the 64K Atari w/1050 drive for our demo system. A byproduct of all this is that we have a program for Atari computers which accomplishes the design goals mentioned. I enclose a booklet documenting the comparative advantages of the MICROMOD program for a user seeking utility from a file manager/word processor. There are not enough of these customers using Ataris to make mass marketing feasible, but we'd like to make it available to those who are.

Steve Boduc
MicroMiser Software
Orlando, FL

A. I'm mentioning your product because of the relative scarcity of true business-dedicated programs available for the Atari. Readers should be aware that MicroMiser calls *MICROMOD* an Integrated Modular Bsuiness System that is not suitable for the hobbyist (as is *HomePak* and *SynFile*), but rather for business persons "seeking utility only." While the specs that MicroMiser sent me look good, I have not seen the actual program in use and thus cannot give an evaluation of its performance. The price is $39.95. Those wanting more information should write to MicroMiser Software, 1635-A Holden Ave., Orlando, FL 32809.

Newsletters

A well designed newsletter was in the mail this month from H.A.C.E., the Houston Atari Computer Enthusiasts (P.O. Box 562, Katy, TX 77492, BBS: 713-644-6400). If your users group publishes a newsletter, send it in and let me know if you participate in a newsletter exchange program. In this way, your group will be able to swap newsletters with other groups reading this column. It's truly interesting to see the Atari newsletters of groups from other parts of the country, Canada and beyond, and I highly recommend that users' groups participate in a newsletter exchange.

Prizes

Cartridge games from Epyx and Sega are being sent to Ricky Freeman, for his Joystick Tester published in the March 1985 issue, and to David Garvin, for his printer utilities published in the December 1985 issue. More prizes will be given away for the best contributions of 1986, and hopefully I'll have even more room this year to print readers' contributions.

For April I have a copy of WSI's 360-page *Atari XL User's Handbook* ($15.95, Weber Systems Incorporated, 8437 Mayfield Road, Cleveland, OH 44026) just waiting to be given away to a lucky reader in our first random (as in RND(0)) drawing. Anyone who writes with a question, comments, contribution, order, etc. before 4/31/86 will automatically be entered in the drawing, or you can simply send me a postcard with your name and address.

New Products

Still looking for a modem? Atari's new XM301 might be just the answer. The XM301 is an auto-dial, auto-answer, 300-baud modem that connects directly to the serial port (or daisy chains with the disk drive) and requires no interface. Included is XE-Term, an excellently designed communications program that supports the 130XE's additional memory. At $49.95 suggested retail, XM301/XE-Term package is a great buy. Contact: Atari Corp., 1196 Borregas Ave., Sunnyvale, CA 94086.

Your Atari 400/800/XL/XE can be just like its big brother ST with a mouse from Zobian Controls. Actually, it's called the "RAT" and includes a mouse-controlled drawing program and a routine that lets your "RAT" move your cursor. A booklet shows you how to use the mouse in your own BASIC programs, but be advised that it won't work with commercial software not designed sepcifically for it. The "RAT" is about $100. Contact: Zobian Controls, P.O. Box 6406, Wyomissing, PA 19610.

AtariWriter Plus Is Here

Has *PaperClip* met its match? Months after Atari's press announcement of *AtariWriter Plus*, I've finally had a chance to try out the new word processor, and my initial impressions are highly positive. *AtariWriter Plus* has all the features that made the original *AtariWriter* popular, plus a lot more: word alphabetization and counting, double column printing (on any printer), "insert" and "typeover" modes, the ability to write a customized printer driver for virtually any printer, an 80-column *editor* (expandable up to 249 columns), a mail merge, and a 36,000-word spelling checker on a separate diskette. A 130XE version of *AtariWriter Plus* is included on the reverse side of the main diskette. The two-diskette package is supported by a 66-page manual. Look for a formal review in an upcoming *Computer Shopper* issue. Contact: Atari Corp., 1196 Boregas Ave., Sunnyvale, CA 94086.

PixMix — How It Works

Last month's feature program, the *PixMix Puzzle*

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Atari Help

by Jeff Brenner

In last month's "Atari Help" column, I listed several manufacturers of memory expansion products for the 800XL. I inadvertently omitted Newell Industries (600 E. Hwy. 78, #602, Wylie, TX 75098). Newell also produces a 256K upgrade for the 800XL ($99.95 complete, or $49.95 without RAM chips). In addition to those readers credited in last month's column for contributing information on the memory expansion topic, let me also thank Danny L. Becker (APO NY) and Karel C. Sysala (Los Angeles, CA), whose letters arrived too late to be icluded in that issue.

XL "Video Smears"

Q. I write in response to the letter in "Atari Help" from Robert Davis of Yorba Linda, California, printed in the December 1985 *Computer Shopper*.

I am having the same trouble using a monitor with my Atari 800XL: namely, a "video smear" such that characters appear blurred. I switched monitors; same effect. Monitor works beautifully on a friend's Apple. Switched cables; no improvement.

Is this an inherent defect in the 800XL series, then? I was able to try a new 130XE and found that characters are much sharper. I was planning to add Omniview to my XL, but am no longer interested: things are bad enough with 40 columns.

I'd appreciate other readers' experiences

Alan McPherron
Pittsburgh, PA

A. Several readers have commented about an apparent blurred Atari 800XL image and in the past I have suggested checking cables, switching monitors, etc. But I am beginning to suspect that the 800XL itself may be at fault. (Apparently, some 800XLs, 1200XLs and 600XLs suffer from the blurred image, but not the 130XE). One theory is that a pixel shift, introduced by the earlier GTIA chip, is responsible for the blurred image. Or had Atari used inferior components in its financially troubled days? An Atari spokesperson said she did not know of any problem. Hopefully we'll hear from other readers on this topic.

Data Files

Q. In experimenting with the DOS files, I tried making a complete record with several strings. What I mean is linking strings together to make one long string: Ex. LET REC$(1,20) = NAME$, LET ADDR$ = REC$(21,40), etc. This seemed to have worked but I got garbage in the blanks. I tried filling the string with blanks before filling it and it still didn't work. How do I accomplish one record from several prompts, and is there a way to view the records in a data file? I've worked with FMS on Data General and we could view the records in the file to verify them.

David Bucci
N. Kingsville, OH

A. You should not get garbage (unwanted data) in the blanks if you properly cleared the main string before assigning the smaller strings to it. I assume that NAME$ and ADDR$ are obtained through normal screen input (i.e. INPUT ADDR$) and are not the source of the garbage. Here's a simple and fast technique that takes advantage of the way Atari BASIC handles its string memory to clear the main string:

```
REC$=CHR$(32):REC$(MAX)=
CHR$(32):REC$(2)=REC$
```

where MAX is the total number of characters that REC$ is dimensioned for. The entire string will be filled with character 32, the space character, and subsequent additions to the string will be surrounded by the blank spaces.

To view the records in a data file, you could have your main program read them from disk in the same way they were written (i.e. INPUT #2;TEMP$:PRINT TEMP$;). The maximum number of characters you should read in at one time from a diskette file should not exceed 128 characters. (While up to 256 bytes can be read at a time without an error, anything over 128 bytes will be stored in page 6 of memory, which might upset any machine language routines that you may have stored there.) The best way to do this is to write the main string to disk in chunks of 128 bytes at a time into a temporary string which you can transfer to the main string:

REC$(I,I + 127) = TEMP$.

Another way you can examine a data file is with DOS. Specify the COPY FILE option. When you're asked 'FROM, TO?" type the name of your data file, followed by a comma and an "E:" (i.e. DATAFILE,E:). This will transfer the diskette file to the screen editor.

For a good example of creating and using data file, take a look at the *Mailing List* listing in the June 1985 "Applying The Atari."

Q. A friend has damaged his BASIC cartridge for an Atari 1200XL. Is there any way I can copy the BASIC from my 800XL to disk for him to use. My machine runs the "C" BASIC.

William R. Pew
Everett, WA

A. The program listed under the "DISK-BASED BASIC" heading will allow you to create a diskette which loads the actual BASIC language when booted. It can be used on any 8-bit Atari with a minimum of 48K RAM. (DISK-BASED BASIC will be included on this month's "Applying The Atari" diskette). See program 1.

Type in the program and save it to disk. Place a formatted diskette (containing DOS files) into the drive and run the program. When you press START, the program will write a special AUTORUN.SYS loader to your diskette, and will then save the code for the BASIC ROM in your machine. If you own revision B of Atari BASIC, the program will automatically convert the data into revision C, to eliminate the dreaded revision B bugs.

When it's completed, turn off your computer. Now unplug your BASIC cartridge (or hold down the OPTION key on the 800XL/130XE) and turn the computer on again. The diskette will automatically load the BASIC language into your Atari's RAM, and when the READY prompt appears, you have a RAM-based BASIC.

Once your BASIC is in RAM, you can have some fun with it. Experienced users can examine the memory in locations 40960 through 49151, find where the BASIC commands reside and change them to whatever is desired (the last character of each command must be an inverse video character -- bit 7 set -- and any replaced commands should be the same number of characters in length as the original command). Just be careful where you poke, since you can easily crash the BASIC or make it function improperly. When you run the 'CHANGE THE READY PROMPT" program with your RAM-based BASIC, you can change the familiar "READY" prompt to your nickname, or whatever you want. See program 2.

The "Disk-Based BASIC" loader has been specially designed to permit the SYSTEM RESET key to operate normally. Additionally, DOS 2 and DOS 2.5 users can specify the B. RUN CARTRIDGE option when in DOS and BASIC will be executed, despite the fact that no cartridge is in place!

For those interested in how the RAM BASIC is implemented, two difficulties had to be overcome to make it function properly. First, whenever the RESET key is pressed, a GRAPHICS 0 screen is set up at the top of free RAM. Normally, when the BASIC ROM is in place, the screen is set up directly below the BASIC ROM, at the top of RAM (in systems with 40K or more RAM). But when BASIC is in RAM, this screen is set up on top of part of our BASIC language itself! Unless the disturbed BASIC code is replaced, our BASIC routine is likely to crash.

To solve this problem, a special SYSTEM RESET handler was put into place which automatically replaces 1K of the damaged BASIC code. The result is 1K less of free BASIC RAM (MEMLO is reset upon initialization to provide the 1K of memory for our use) but we are able to use the RESET key normally.

The second difficulty involves DOS. When you call up DOS and choose the "RUN BASIC" option, DOS checks if a cartridge is installed and would normally respond "NO CARTRIDGE" is our RAM-based BASIC is there instead. To get around this, you could press the RESET key to return to BASIC, but if you're using DOS 2 or DOS 2.5, you'll be able to use the "RUN CARTRIDGE" option. An interrupt routine is set up that automatically modifies DOS 2 or DOS 2.5 when it is called up to trick it into believing a cartridge is in place.

The assembly listing of the BASIC loader will be listed here next month.

Requests

If you have been looking for a particular product that others may also be looking for, send me a letter.

Address Atari-related questions to: Jeff Brenner, "Atari Help", c/o *Computer Shopper*, P. O. Box F, Titusville, FL 32781-9990. ●

DISK-BASED BASIC

```
YCJ 10 REM DISK-BASED BASIC INITIALIZATION
KGJ 20 REM COPYRIGHT 1986 JEFF BRENNER
RDJ 30 DIM BASIC$(8192),S$(35),CIO$(7):BASIC$(8192)=CHR$(0)
KFJ 40 FOR I=1 TO 7:READ N:CIO$(I,I)=CHR$(N):NEXT I
GXJ 50 FOR I=1 TO 35:READ N:S$(I,I)=CHR$(N):NEXT I
QVJ 60 PRINT CHR$(125);"THIS PROGRAM CREATES AN AUTORUN.SYS"
NXJ 70 PRINT "FILE ON THE DISK, ALONG WITH A FILE,"
XFJ 80 PRINT CHR$(34);"BASIC";CHR$(34);", WHICH CONTAINS THE BASIC"
QEJ 90 PRINT "LANGUAGE.":PRINT :PRINT "INSERT BLANK FORMATTED DISK INTO DRIVE"
XTJ 100 POKE 85,7:PRINT "PRESS <START> TO CREATE FILE"
PCJ 110 IF PEEK(53279)<>6 THEN 110
HJJ 120 PRINT :PRINT "CREATING AUTORUN.SYS..."
THJ 130 CLOSE #1:OPEN #3,8,0,"D:AUTORUN.SYS"
WRJ 140 RESTORE 240:FOR I=1 TO 309:READ N:PUT #3,N:NEXT I:CLOSE #3
JGJ 150 A=USR(ADR(S$),ADR(BASIC$)):IF ASC(BASIC$(2272))=202 THEN GOSUB 500
MUJ 160 POKE 881,0:OPEN #3,8,0,"D:BASIC":PRINT "SAVING BASIC..."
RSJ 170 H=INT((ADR(BASIC$)-6)/256):L=ADR(BASIC$)-6-H*256:POKE 884,L:POKE 885,H
GOJ 180 POKE 880,0:POKE 889,32:POKE 882,11:I=USR(ADR(CIO$),48)
HQJ 190 CLOSE #3:PRINT "FINISHED.":END
QVJ 200 DATA 104,104,104,170,76,86,228
EEJ 210 DATA 104,104,133,205,104,133,204,169,0,133,206,169
EMJ 220 DATA 160,133,207,160,0,177,206,145,204,200,208,249
YOJ 230 DATA 230,205,230,207,166,207,224,192,208,239,96
UPJ 240 DATA 255,255,215,5,255,6,165,12,141,108,6,165
UGJ 250 DATA 13,141,109,6,169,107,133,12,169,6,133,13
UHJ 260 DATA 162,0,142,68,2,232,134,9,169,160,133,106
OLJ 270 DATA 32,175,6,78,197,2,160,3,140,114,3,200
VZJ 280 DATA 140,122,3,169,228,141,116,3,169,6,141,117
RIJ 290 DATA 3,162,48,32,86,228,169,7,141,114,3,169
VTJ 300 DATA 250,141,116,3,169,159,141,117,3,206,121,3
UUJ 310 DATA 32,86,228,14,197,2,169,119,141,252,2,173
NVJ 320 DATA 231,2,133,2,141,229,6,173,232,2,133,3
TPJ 330 DATA 141,230,6,24,105,4,141,232,2,169,214,141
WIJ 340 DATA 250,191,169,6,141,251,191,162,4,160,0,185
OSJ 350 DATA 0,189,145,2,200,208,248,230,3,238,86,6
URJ 360 DATA 202,208,240,169,188,141,86,6,208,44,32,0
QEJ 370 DATA 0,169,160,133,166,32,175,6,32,200,6,24
OAJ 380 DATA 165,4,141,232,2,162,4,160,0,177,2,153
WGJ 390 DATA 0,189,200,208,248,230,3,238,134,6,202,208
UMJ 400 DATA 248,169,188,141,134,6,173,34,2,141,254,6
QOJ 410 DATA 173,35,2,141,255,6,162,6,160,231,169,6
PHJ 420 DATA 32,92,228,76,0,160,169,3,141,98,3,169
TTJ 430 DATA 228,141,100,3,169,6,141,101,3,169,12,141
QVJ 440 DATA 106,3,162,32,76,86,228,173,229,6,133,2
OBJ 450 DATA 141,231,2,173,230,6,133,3,96,32,200,6
MRJ 460 DATA 76,80,6,68,58,66,65,83,73,67,155,83
SUJ 470 DATA 0,0,173,249,38,201,253,208,5,206,249,38
VGJ 480 DATA 208,10,173,89,39,201,253,208,3,206,89,39
OOJ 490 DATA 76,0,0,224,2,225,2,215,5
MZJ 500 PRINT "CONVERTING REV.B TO REV.C BASIC..."
BRJ 510 BASIC$(2272)=CHR$(234):BASIC$(2273)=CHR$(240):BASIC$(2274)=CHR$(17)
AOJ 520 BASIC$(2275)=CHR$(234):BASIC$(6954)=CHR$(0)
DCJ 530 FOR J=8180 TO 8186:BASIC$(J)=CHR$(0):NEXT J:RETURN
```

PROGRAM 1

CHANGE THE "READY" PROMPT

```
ELJ 10 REM CHANGE THE "READY" PROMPT
RVJ 20 M=48504:IF PEEK(48498)=169 THEN M=48493
YDJ 30 DIM A$(6)
GAJ 40 PRINT "WHAT'S THE NEW PROMPT";:INPUT A$
NMJ 50 IF LEN(A$)>5 THEN PRINT "5 CHARACTERS MAXIMUM":GOTO 40
UUJ 60 IF LEN(A$)<5 THEN FOR I=LEN(A$)+1 TO 5:A$(I,I)=CHR$(32):NEXT I
CBJ 70 FOR I=1 TO 5:POKE M-I,ASC(A$(I,I)):NEXT I
MAZ 80 PRINT "PROMPT HAS BEEN CHANGED!"
```

PROGRAM 2

APPLE

Apple Works Find-A-File

by Michael Tulloch

AppleWorks is an excellent integrated program for the Apple IIe and IIc computers. Combining data base management, spreadsheet, and text processing within one framework, AppleWorks simplifies office tasks and is wonderful for the home and small business user. Coupled with a hard disk, it may even meet the needs of a moderate sized business.

Once attached to AppleWorks, it's hard to accept other products. Programmers are beginning to develop all sorts of enhancements for the original AppleWorks. Some of these are quite specialized (AE's Desktop Expander), some are quite handy (telephone controllers), some are separate programs (HabaMerge, MegaWorks), and some are also integrated (Jeeves).

These enhancement products all do something needed but that the AppleWorks developers omitted. The better ones operate without forcing the user to leave AppleWorks.

My company is a growing small business. We can still live with boxes of floppies and without networking. However, finding files located on one of several disks has become a significant time waster. With different people generating files on different disks (all of which are nearly full), it's all too easy to misplace an important file. When a file is placed on the wrong or mislabled disk, a real search can ensue.

During one such search, just to find one particular file, we cataloged all the AppleWorks diskettes in the office. After the second massive search in one day, I decided there must be a better way. Why couldn't AppleWorks search for me? The following program is the result.

This program falls somewhere between separate software and integrated software, or perhaps it is both. I call it CATer. The CATer can be run once a week, or more often if many files are being generated. By placing the AppleWorks disks one after another in the data-disk drive, CATer will read and remember the contents of the directory (catalog). After all disks have been read, CATer stores the information in a text file on one AppleWorks disks. Then start up AppleWorks. By choosing the "Add Files To The Desk Top" option, "Make a New File" for "3. The Word Processor," and selecting "From a Text (ASCII) File," an AppleWorks word processor file can be created that contains a list of all the files on all AppleWorks diskettes. Save this file as CATALOG. Figure 1 is one page from my resulting word processor file.

When you want to search for a document, load in the CATALOG file. Do an open-apple S, choose "Text," and enter the name of the lost file. Presto! Each file with that name is found. Next, simply look for the diskette with the name in the catalog associated with that file, and you're finished.

I have an Applied Engineering RamWorks card in my Apple, so my desk top has 180K available. The CATALOG file, along with my telephone number file, is kept on the desk top all the time. Telephone calls and now file searches are only an open-apple Q away.

Here is how the program works. The listing is printed in Figure 2. Each line has a descriptive REMark so that just reading through the listing should provide a good idea of how the program works in detail. The following paragraphs are an overview.

Two arrays are DIMensioned. The "A$" array holds the file names. It allows 20 catalogs with 50 files in each one. If there are more than this, change the subscript values in line 10. The "T" array holds the number of files in each catalog. The main part of the program starts in line 1000. After some initialization and the screen is set up, the number of catalogs and files are printed to the screen. The user is then asked if he wishes to list another catalog. A "Y" or "N" is required. If the answer is "Y", the subroutine at 100 is executed.

This subroutine prompts for the user to insert the next disk to be CATALOGed into the drive. It then asks for the name to be printed on the diskette. Note that this is the ProDOS directory name. Path names are allowed. If diskettes are habitually named "Freddy" on the label while they are CREATED as "/UTILITY.PROGS" you're in deep trouble with this program and in many other ways besides! Seriously, modify the program here to allow additional identifiers or descriptive statements. Line 120 assures that the name supplied starts with a ProDOS slash. The number of catalogs read is incremented, the number of files contained in the current catalog is set to zero, and the ONERR is set to line 2000.

Line 170 opens the DIRECTORY file using ProDOS "T" suffix. Each entry of the directory is then read. ProDOS stores in its directory an entry image of the directory as printed to the screen by the CATALOG command. I chose to truncate to 40 characters the information saved. To keep the whole catalog entry, change the number in line 200 from 39 to the length wanted. For 80 characters, eliminate line 200. Line 210 can also be eliminated if the catalog listing

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Ask The Guru

by Don Lancaster

Be sure to stop in at the *Comuter Shopper* booth at the West Coast Computer Faire April 3-6 in San Francisco's Moscone Center. I'll try and be on hand to meet you all four days. I'll also haul along a bunch of autographed books and software, particularly the new Laserwriter Utilities, my new Ramcard Disassembly Script, and my freshly reprinted *Micro Cookbook, Volume I.*

Bee should be there with her demos to answer your desktop publishing questions, and I'll probably be speaking on laser printing with the Apple IIe.

Drop by for a while.

So much is happening so fast, that I don't know where to even begin. Forrest Mims sent me a copy of his brand new *Siliconnections* book, a most readable history of the roots of the microcomputer revolution.

And Tom Weishaar sent along his *Your Best Interest* book on calculating interest rates using a spreadsheet. Tom reveals many of the things that banks and other lending institutions definitely do not want you to know about.

I also just got word on an incredible new card for the IIe that lets you cheaply display real photographs and video images directly on your Apple IIe monitor screen with full gray scale. I'll be using this exciting new system to directly print photographs using Applewriter along, of course, with the Laserwriter. One obvious use is for real estate people who can print a "photograph" directly on their home listings.

But, we'll have to save details on this mind-blower for a future column.

On with this month's goodies . . .

What is the word on the new 6502?

I just ran into a really exciting new microprocessor chip that should be ideal for most any small controller, trainer, or data gathering use. Its the Mitsubishi M50734 and sells for $12 in singles, dealer stock. It is built in CMOS and speaks 6502, so it should be real easy to use with Apples, Commodores, Ataris, and the rest of the 6502 gang.

Internal bank switching is used to create a double sized 128K address space. The second 64K switches only on indexed instructions, so it is primarily intended for use as data storage.

No RAM or ROM inside, but you simply will not believe all of the ready-for-use peripheral circuitry stuffed into this beast. How does 40 I/O lines, 9 timers, a four input A/D converter, two dual phase stepper motor drivers, a Centronics port, a pulse position modulator, a synchronous serial circuit, and a two-way UART serial interface sound?

Operating power is around 150 milliwatts, but this can be dramatically reduced by lowering the clock frequency, and can be almost entirely shut down (to 5 microamps!) with an external sleep provision.

If that's not enough for you, there are enough pins on the package that you can also put it to use as an emergency cheese grater.

Obvious uses would include data recorders, hydroponic gardening timers, cable tv intelligent taps, solar powered pump interfaces, general robotics, weigh scales, cattle feeder setups, student trainers, hot tub pump cyclers, cotton picker tooth setters, numeric machine controls, etc. etc.

Several minor gotchas. The 64 pin, 70 mil shrink DIP package is oddball, so sockets may be very hard to find. An 8X clock is needed, and a large block of page zero addresses is reserved.

In addition, there's not enough pins to go around, so they used the $#@% Motorola style pin multiplexing on the data/low address lines. At the very worst, this means you'll have to add a 74HC373 address latch to your final circuit.

There does seem to be a 72 pin flatpack in the works, but when it becomes available and whether it will demultiplex the low address lines for you waits to be seen.

It might even be possible to drop this dude and an adaptor directly into the 65C02 socket on an Apple IIc or IIe, and then run everything else out of a humongous I/O connector.

But you would have to be very sneaky to convert Apple's 1X clock with its precisely controlled intentional jitter into the 8X clock as needed by this chip. Switching around the page zero locations could get tricky, and a few of the Apple signal lines would have to get faked.

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The Observatory

by Philip Chien

Where's Halley's Comet? Or Jupiter? Or the constellation "Orion?" If you have a star chart, it's easy enough to find out. "Observatory" is a program that makes your Apple into a star chart, but a star chart hundreds of times more accurate than normal star charts.



Unlike paper star charts, "Observatory" allows for the observer's location, the exact time of day, locations of planets and other "local" objects, and even gravitational influences.

When you boot "Observatory" you are asked to enter the latitude, the longitude, the date, and the local time. If the date is between April and October, the program will ask if you entered daylight-saving time. The program is accurate enough to calculate the sky for any position to within 30 meters (100 feet) of accuracy. It will actually draw a slightly different sky for locations less than 100 feet apart, if the data is entered accurately enough. For the most part, approximate latitude and longitude within five degrees is close enough. The program is able to calculate to within a second of an arc (about the width of a dime seen from a mile away).

A "Please Wait" time indicator will appear at the top of the screen, and the program will calculate the appearance o fthe sky for the data typed in. All of the calculations are accurate (you can enter the latitude and longitude to within a second of an arc). But the program takes about two minutes to draw the preliminary screen. If you use the program often, you'll want to get a speed-up card for your Apple. With the Accelerator IIe, it takes "only" thirty seconds to draw the screen.

The preliminary sky, a "fish-eye" view of the entire sky, shows stars, planets, moons, and Halley's comet. After the sky is drawn, galaxies, novae, clusters, etc. can be added by hitting the "A" key, and constellation lines with the "C" key. The "IJKM" arrow keys will move the cursor to different parts of the sky, and the "Z" key magnifies whatever section of the sky you are looking at. If the cursor is on top of an object, hit the "Q" key, and the program will tell the astronomical name of the object and any other data the program may have on the object (magnitude, distance, popular name, etc.)

With over a hundred dots on the screen, it may be difficult to find the object you want to look at. A versatile, and simple-to-use (once you get the hang of it) search routine is included to help you find any object you are searching for. If it is not visible, the program will tell you about it. With a forced search to find the object, the

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CP/M On The Apple IIc

by Philip Chien

The Apple IIc Reference manual (Apple p/n A214030) specifically states (Vol 2 Pg 38, Section D.1.4) "CP/M, and any other operating system that requires an interface card, will not work on the Apple IIc." Well, to quote the James Bond film, "Never say never."

Enter Applied Engineering. AE has been around in the Apple field since 1979. Their motto is "We set the standard," and AE tries to live up to it. Originally, AE was another "me-too" mail order company. Their Z-80 card came with little documentation and no software. The user was expected to write or "obtain" (read steal) the software needed to make the card operate in CP/M. The other interface cards sold by AE were also designed as "compatible" with other popular cards.

Fortunately, Applied Engineering's company policies have changed. Instead of unsupported products, their products are now among the best Apple peripherals available. Where other companies have changed their product lines to support the IBM-PC, AE actually encourages IBM users to exchange their machines for better machines--Apples. Unlike other companies that are putting most of their marketing and development work into IBM machines and forgetting about Apple owners, AE proudly proclaims that it supports Apple and only Apple. Although AE still sells the same Z-80 Plus card that they sold two years ago, it now comes with a fully licensed CP/AM 4.0 (an advanced version of CP/M) and manual. Application programs can easily be configured with CP/AM. But I digress.

The flat statement in the Apple IIc reference manual was taken as a challenge by the AE engineers. They designed two different Z-80 enhancements (you can't really call them "cards") that are available for the Apple IIc. They mount inside the Apple IIc's case and connect directly to the Apple IIc's CPU chip. Naturally, whichever version you get, it comes with a licensed copy of CP/AM 4.0 and manual.

Z-80c and Z-RAM differ in one major aspect. Z-RAM also provides you with up to 512K of RAM, which can be, and very often is, used with normal Apple mode programs. This review is based on the Z-RAM board, but also applies to the Z-80c.

Installing Z-RAM takes about twenty minutes, a Phillips screwdriver, and an IC puller. After you open the IIc's case, you must remove two chips from the motherboard, the CPU (the 65C02 microprocessor), and MMU (Memory Management Unit). The Applied Engineering board is then plugged into the empty sockets, and the CPU and MMU chips are plugged into the AE board. A gripper clip is then attached to pin 2 of the TMG (Timing Generator) chip. All of this is relatively easy to do, is well documented in the AE manual, and, as long as you don't harm the IIc's motherboard, **it does not void your Apple's warranty.** If you are not sure about opening your IIc's case, you may want to have your Apple/Applied Engineering dealer install the board for you.

Once your case is re-assembled, you can't tell that the card has been installed. All of the normal programs will work without any modifications of pre-boots. If you boot the CP/AM diskette, or any diskette configured to work with the original Microsoft CP/M card, you will see the screen display:

```
CP/M
(c) Digital Research

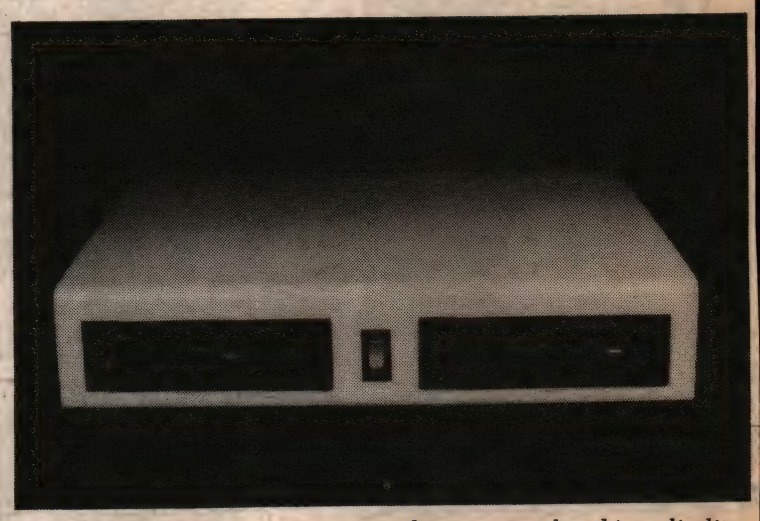
A>
```

You're in CP/M. All standard CP/M programs, including Wordstar, Turbo Pascal, dbase, Condor, Fortran, COBOL, etc. will all work. Any CP/M program that works on the Apple IIe in CP/M format will work with the Z-RAM board, as long as it doesn't use hardware unavailable in the IIc (e.g. real time clock board, custom hardware, etc.). All you have to do is specify Apple CP/M format when ordering the program. There are more Apples with CP/M than any other CP/M computer, so almost all software housed with CP/M programs have their programs available in Apple format.

CP/M is okay, but it's also twelve years old. A minimum CP/M system today has a CRT terminal, 64K of RAM, disk drives, and the more powerful Z-80A processor. Unfortunately, CP/M is also very limited. The practical maximum RAM

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EquiDisk+ Gives Apple Large Storage Capacity



H&M Disk Drive Services, Inc. has introduced the new EquiDisk+, a subsystem for the Apple II+ and IIe that increases data storage to 737 kilobytes on each 5.25-inch floppy disk and allows CP/M users to access foreign formats.

The EquiDisk+ enables Apple II+ and IIe users operating under DOS 3.3, ProDOS or CP/M to store data on high-capacity, 80 track disk drives using standard 5.25-inch media.

The EquiDisk+ is a complete package. It includes an EquiDisk+ controller card, software instruction manual and two (or optionally one) disk drives. The EquiDisk+ half-height, high-capacity disk drives are enclosed in a slimline case that fits neatly between the computer console and monitor. The case, with built-in surge suppressor, is equipped with three AC outlets and allows the user to control power to the computer, monitor and printer with the EquiDisk+ front-mounted on/off switch.

EquiDisk+ permits Apple users, operating under CP/M, to run software formatted for TeleVideo computers, enabling them to interface on a disk level with other CP/M machines.

The software provided with

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MACINTOSH

MacUniverse

by L.J. Kutten

The New Macintosh Plus

On January 16th at the San Francisco MacWorld Show, Apple Computer publicly displayed the Macintosh Plus. This computer is an upgrade of the present 512K Macintosh. The Plus includes (1) one megabyte of memory (expandable to four megabytes when larger capacity chips are available); (2) 800K disk drives that operate at twice the speed of the 400K drive; (3) a Small Computer System Interface (SCSI) port that allows up to seven peripherals to be simultaneously daisy-chained to the Macintosh Plus; (4) a 128K ROM that offers a Hierarchical File System allowing the Macintosh Plus to operate faster and more efficiently than a 128K or 512K Macintosh; and (5) a new keyboard with built in cursor keys and a numeric keypad. The Macintosh Plus will have a suggested retail price of $2,599 and will be available for the foreseeable future. Its suggested retail price has been lowered $500 to $1,999.

What Was Not Announced

Contrary to earlier rumors, no color Mac nor expansion slots are available. Apple did not announce an upgrade for the 400K external disk drives. According to my investigation this was not an oversight; there is no upgrade available. Instead, new 800K external drives must be purchased (they have a suggested price of $499). Finally, Apple failed to announce any modifications for its Hard Drive 20. Currently this unit works off the external disk drive port. It seems inconceivable that Apple would not adopt the SCSI interface. Yet, if it does, what happens to those brave pioneers who early on bought the Hard Drive 20? Will Apple have an upgrade for them or are they stuck with obsolete units?

And A New Unit Mac is Still Coming

Even more surprising were some news reports about still another Macintosh planned for release later this summer. The only information available was that this unit would have an open architecture, allowing users to install various cards.

The End of MacPaint and MacWrite

Since Apple does not provide MacPaint and MacWrite with the Macintosh Plus, my sources tell me not to expect any more major improvements in them. Supposedly there was a long debate at Apple before deciding to stop providing them free of charge. Apple felt they had served their purpose by helping ensure acceptance of the Macintosh. Apple realized that these programs discouraged others from developing other word processing programs and paint programs.

I am sorry to see this development. The universal acceptance of MacPaint and MacWrite meant that at least I could trade disks with people all over the world and know that they could read them. Without a universally accepted standard, that just is not possible.

Yet, MacPaint and MacWrite are not totally dead. They can still be purchased separately at $125 apiece. I predict that, to make the sale, a large number of dealers will throw them in with a Macintosh Plus.

LaserWriter Plus Comments

I have seen some sample printouts from the new LaserWriter Plus. The seven new typefaces are simply outstanding. It should be interesting to see how this unit affects small print shops.

I find the pricing structure of the Laserwriter Plus intersting. You would think that Apple would lower the price on the base LaserWriter, as it did on the Macintosh 512, and price it so a buyer would be encouraged to buy a LaserWriter Plus. The current LaserWriter costs $5999, and the LaserWriter Plus will cost $6798. This is a difference of $799, which is the same price as the upgrade. This makes no sense to me. I would think Apple would prefer that people buy the Plus.

A possible answer could be that there is no LaserWriter Plus machine actually being built. Perhaps, for the foreseeable future, Apple intends to have all LaserWriter Pluses manufactured by upgrading regular LaserWriters.

Applecare Update

If you already have Applecare and upgraded your equipment, do not let your dealer convince you to immediately upgrade your policy. Apple has officially decided not to gouge its installed Applecare user base who upgraded. Any upgraded equipment will be covered under the current Applecare agreement until the end of the term. At that time, the customers must purchase Applecare for the new upgraded system.

Trade in Your Lisa/Macintosh XL

Apple, perhaps finally realizing it had made a mistake, has announced a trade-in policy for owners of the Lisa and the Macintosh XL. For $1,498, U.S. owners (no word about Canada and other countries) can trade in their computer for a Macintosh Plus and a Hard Disk 20 through participating Macintosh XL/Lisa dealers. This program will run from April 15 through August 31, 1986. I recommend that all Lisa and Macintosh XL owners take advantage of this offer since it is very apparent that Apple will not support these machines. Already I am hearing horror stories about hard-to-get parts and dealers refusing to provide any service. I predict that if you keep your Lisa or Macintosh XL, within 18 months, you will have nothing more than an expensive door stop.

Apple vs. Jobs Law Suit Settled

Apple and Steve Jobs, former chairman and co-founder of the company, have settled their legal battle. Last September, Apple sued Jobs when he announced he would be starting his own computer company. Apple accused Jobs of misappropriating confidential information, violating his employment contract by starting his company, Next Inc., before he resigned and luring away key Apple employees.

The settlement requires that Jobs not build a product that would directly compete with Apple, promise not to hire anymore Apple workers for the next six months, and not to release any product until 1987. Apple also has the right to inspect any new Next Inc. computers to determine whether any of Apple's information or technology was used. If Apple finds any violations, an arbitrator will be appointed to settle the case.

Personally, I hope Jobs succeeds, but do not be surprised if he falls flat on his face after sinking a large amount of his personal fortune into his venture. The microcomputer industry is full of stars who had only one hit. Try to think of any microcomputer company, either hardware or software, that has two successes. I cannot. Even mighty Lotus Development has only Lotus 1-2-3.

A Little Rain On Apple's Parade?

In a surprise announcement General Computer Company, the manufacturer of the internal Hyperdrive hard disk, announced the Hyperdrive 2000. This is a high-performance coprocessor board and internal hard disk for the Macintosh and Macintosh Plus. The board replaces the Macintosh CPU with a 12-MHZ 68000 microprocessor, adds an additional 1.5 megabytes of RAM, and puts in a floating point 68881 coprocessor for high speed numerical calculations that effectively doubles the Macintosh's internal processing speed. The drive is a 20 megabyte internal hard-disk. Hyperdrive 2000 will ship in April with a suggested retail price of $3195.

As much as I respect the Hyperdrive, this upgrade scares me. Replacing the CPU is never a wise thing to do. I would wait and let somebody else be the pioneer.

Other Hard Disks

Between now and next June, do not rush out and buy a hard disk. Apple's adoption of the Small Computer Systems Interface (SCSI) means that Macintosh hard-disk prices will fall rapidly since there is now a uniform standard companies can follow.

Already a number of companies have announced units. AST Research will release a $6995 unit that has a 74 megabtye hard disk and 60 megabyte streaming tape backup subsystem. MDIdeas, Inc., has announced the HD-20 and HD-30. These are 20 and 30 megabyte external hard drives which will cost $1095 and $1595 respectively. MICAH, Inc., has unveiled the MicaDrive 10AT and 20AT. These are internal autobooting hard disks which are user installable on the Macintosh main logic board. The 10 megabyte unit has a suggested retail price of $1495, and the 20 meg version, $1895. In early March, Univation, Inc., will ship its SlimLine Subsystem, a 30 megabyte fixed Winchester hard disk drive mounted vertically above a 10 megabyte removable cartridge hard disk drive. Suggested retail price will be $2795. Finally, Iomega Corp. says its family of Bernoulli Box subsystems will support the Macintosh Plus. Starting in February 5, 10, and 20 meg single drive systems and two dual-drive units will be available. The systems range in price from $1,795 to $4,495.

I am willing to bet even money that most of these units will actually come to market with a lower price. The SCSI interface means that generic hard drives can be attached. If you read any of the IBM PC magazines, you will see prices of $700 to $800 for a 20 meg hard drive. I expect to see the same thing on the Macintosh by the end of summer.

New MacTerminal

Apple has released version 2.0 of MacTerminal. It has the following enhancements:

1. MacBinary file transfers are not supported.
2. When using the AppleLine protocol converter, status information in the IBM 3278 mode, the status line is displayed on the 25th line rather than being multiplexed with the 24th data line.
3. The LaserWriter is now supported.
4. The backspace and delete keys can now be swapped.
5. The file transfer dialog now includes an option called"save screens before clearing,"which scrolls the contents of the screen off top before clearing, so that information isn't clobbered by a screen clear. This defaults to off.
6. The delay between charcters setting (also in the file transfer dialog) now controls the option-click cursor key speed, as well as file transfers.
7. In Mac-Mac file transfers, if the file already exists,the

continued on page 50

MacUniverse

continued from page 49

string "via MacTerminal" is still appended. Now, however, if that file already exists, it is scornfully deleted.

8. Several crashers were fixed, including the disk full, while pasting or sending a text file.

9. Wait for call now waits for a call and tries to convince the modem not to answer the phone at any other time.

10. Speed was increased throughout the program. Version 2.0 receives and displays characters about 1.5 times as quickly as MacTerminal version 1.1.

11. Holding down the option key when choosing either the"clear lines off top"or "reset" menu items will skip the confirming dialog box.

This upgrade is free. Get it by taking your master MacTerminal disk into the dealer and copying the upgrade onto it.

Other Software Upgrades

While I am on the subject of upgrades, both Lotus Development and Microsoft have announced software upgrades. Lotus has released Jazz version 1A. The new features include no longer needing a key disk when using a hard disk, faster disk access, large document sizes, support of the numeric keypad, and faster LaserWriter printing. This upgrade is free for owner who purchased Jazz after January 16, 1986. Otherwise it is $20 for all other registered owners. Microsoft's announcement covered that old warhorse, Multiplan. Deemed a major upgrade, this is version 1.1. For $25 the user gets (1) improved printing capabilities, (2) LaserWriter support, (3) seven new financial functions (4) variable fonts and font sizes in one document, and (5) a second spread sheet window.

Mac Expo Set

If you live near Chicago, block out April 25-27 on your calendar. On those dates, MACazine and Collin Bryant Associates will sponsor the Mac Expo at McCormick Place, Donnelly Hall. With over 100 exhibitors, this show promises to have something for everybody. The fee for all three days is $15 and allows you to also attend seminars on such topics as desk top publishing. Lisa Support, and how to use Microsoft products.

MacLightning

SoftDesign, Inc. has released MacLightning. This is a $99.95 RAM resident software tool that is accessed as a desk accessory. It will allow users to access and manipulate a variety of data libraries and reference words. In its initial version, MacLightning is being marketed as a 31,000 word dictionary and grammar checker. It will work simultaneously with virtually any application, including Jazz, Omnis 3, PageMaker, Word, and ThinkTank. It checks an average of 43 words per second, with a top speed of 60 words per second if a hard drive is used.

MacLightning may be operated simultaneously with other applications or used only as needed. When left in the "Spelling On" mode, it will monitor each strike of the keyboard and beep when a misspelled word or wrong grammar usage is detected. MacLightning has a"HOT KEY" feature that allows the user to quickly correct errors within a document, add words to a dictionary, or jump between an application.

Activision Revisited

Last month I had some nasty things to say about Activision, as I was extremely unimpressed with their products. Well, I must eat part of those words. This month I received their game, Borrowed Time, and have thoroughly enjoyed it. Borrowed Time is an illustrated text adventure in which you, the player, are detective Sam Harlow in 1934. Somebody is trying to kill you and you have to determine who.

The game starts off with you sitting in your office and the phone rings. You answer it, and a voice warns you that somebody is trying to kill you. Before you have time to think, two goons are whistling lead in your direction. As you try to elude him, you must wander the streets of the city and meet a variety of people who have bits of information. A major part of the game is trying to convince them to talk to you, and once they do talk, to determine who is telling the truth.

It took me about forty hours to solve the mystery. Since the game has a suggested price of $39.95, that means it cost $1.00 an hour. For me that is an excellent investment.

Another One Bites the Dust

On January 9th, Paladin Software, the publisher of Crunch, filed for bankruptcy under Chapter 11 of the Bankruptcy Code. Under Chapter 11 a company gains court protection from its creditors while it attempts to restructure its debts. Paladin was forced to file because a wee earlier some of its creditors had tried to force it into involuntary bankruptcy and liquidation. The creditors claimed they were owed more than $80,000.

The reason for the bankruptcy action is simple. Paladin did not sell enough copies of Crunch. According to Paladin's president, Theodore Newlin, "The Macintosh (software) market just fell far short of our expectations." I am sorry to say this action did not surprise me. Crunch was an excellent product, but way overpriced.

Paladin claims this action will not affect the marketing of Crunch or the development of its new product, SuperCrunch. I certainly hope so. I like Crunch and felt it is much easier to use than Multiplan and Excel. I am also enthusiastic about SuperCrunch. I saw it demonstrated at COMDEX last November and have been working with a beta version of it for a month. It is quite powerful and much easier to master than either Excel or Jazz.

Compuserve Software

This month's Compuserve picks both deal with the stars. One is a practical star charting program and the other is the Space War game.

Star Charts

This program will appeal to all astronomy buffs. Comprised of two programs, STARCH.BIN and STAR.BIN, Star Charts can display 1573 stars by plotting a portion of the night sky on the Macintosh screen. The user may either enter sky coordinates or choose from a list of constellations. Once the stars are displayed, you can retrieve coordinates, magnitude, and color of any star on the screen by clicking on it. Star Chart is a stand alone application that will run on 128K Macintosh. Both files are found in the DL1 database under PPN 74146, 2362.

Space War

This game is found in the DL4 database and is comprised of three files, SPACE1.BIN, SPACE2.BIN, and SPACE3.BIN, stored under PPN 76703, 401. It is the classic space war game where the player does battle with an enemy spaceship. Features built into the game include length of play, the effect of gravity on the space ships, the amount of thrust given, whether the space ship bounces off the sides of the screen and wraps around, and the range of missiles. This program is free, and it can be copied and redistributed so long as the title pages are not modified.

NOTE: Send electronic mail to the Universe Master. His SOURCE ID# is CPA108. His Compuserve ID# is 70655,376.

Products Mentioned In This Column

Apple Macintosh Plus
Suggested Retail $2495
Apple LaserWriter Plus
Suggested Retail $6995
MacTerminal Version 2.0
Apple Computer Inc.
20525 Mariani Avenue
Cupertino, CA 95014
(418) 996-1010

Jazz Upgrade
Suggested Retail $20
Lotus Development Corp.
55 Cambridge Parkway
Cambridge, MA 02142
(617) 494-1192

MacLightning
Suggested Retail $99.95
SoftDesign, Inc.
14206 S.W. 136th Street
Miami, FL 33186
(305) 253-5521

Multiplan Upgrade
Suggested Retail $25
Microsoft Corp.
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Bellevue, WA 98004
(800) 426-8088

HyperDrive 2000
Suggested Retail $3195
General Computer Corp.
215 First Street
Cambridge, MA 02142
(617) 492-5500

Sidekick and PhoneLink
Suggested Retail $99
Borland International
4558 Scotts Valley Drive
Scotts Valley, CA 95066
(800) 255-8008

Borrowed Time
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2350 Bayshore Frontage Road
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MAC Expo
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Space War
Found in MAUG DL4 Database under PPN 76703,401; Files SPACE1.BIN, SPACE2.BIN, and SPACE3.BIN.

StarChart
Found in MAUG DL1 database under PPN 74146, 2362; Files are STARCH.BIN and STARS.BIN

L.J. Kutten will be speaking at the West Coast Computer Faire on April 5th at 4:15 p.m. ●

New Outline Processor For CP/M Computers!

KAMASOFT, Inc. has introduced OUT-THINK™ a new, low cost alternative for outline processing on CP/M computers. OUT-THINK provides features that are similar to the many successful outline processors on the IBM PC.

OUT-THINK lets you classify text into a familiar, outline structure and then alter and access the text based on that structure. It allows you to hide details and focus on how your main ideas fit together as you create and develop written material. Levels of the outline can be collapsed off the screen, hiding them from view, and then expanded back into view for editing.

In addition to a full screen outline editor with collapse and expand, OUT-THINK offers a full screen text editor for inserting and editing text in the outline. A full complement of copy and move operations are provided, including copying within and between outlines and marking groups of titles in the outline for copying, printing, or deleting.

You can directly read and write text files compatible with most, popular word processors. And you can print the outline with over 20 different formatting parameters, including headers and footers, page numbers, section numbers, and an automatic table of contents.

Additional features include a built-in file manager, information retrieval by keyword, date and time stamping, and password security on outline files.

OUT-THINK can be installed to run on practically any CP/M (Version 2.2 or above) computer, including systems with the 8080, 8085 and Z80 processors, as well as many CP/M emulators running on the IBM PC. It requires at least 48K of free RAM space and an 80 column by 24 line screen.

Suggested retail price for OUT-THINK is $49.95 including shipping. Current owners of KAMAS can purchase OUT-THINK by sending in their KAMAS master disk and $25.00.

OUT-THINK is available directly from KAMASOFT. Call or write KAMASOFT, Inc., 2525 SW 224th Ave., Aloha, OR 97006, (503) 649-3765 for details.

Mention that you read about it in *Computer Shopper*. ●

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COMMODORE

Inside Commodore

by Ted Drude

This month, we'll be looking at how the Commodore RS-232 interface works in greater detail. We'll also catch up on some recent product deliveries from Commodore (and the usual sprinkling of hints, rumors, and inuendo).

Beware The Plus/4 Blitz

As I write this article, the nation is being inundated with a blitz of commercials in magazines, TV, and direct mail offering the Plus/4 and C-16 computers at very attractive prices. Commodore reportedly has several warehouses full of these machines and it looks like they have decided it is time to get rid of them.

I just want to remind everyone that the Plus/4 is not the worst computer that was ever built (remember the Adam!), but it's certainly not the value it's being advertised as, either. Right now, I wouldn't want to buy one, unless I knew the straight facts. Most people aren't getting any of the facts!

Some people who have seen the Plus/4 ads, think that they are looking at the C-128. Most of these are people who have heard about the "new computer from Commodore" from their friends and then the Plus/4 shows up on TV. Others may actually think they are seeing an ad for an Amiga! (A few slight differences there.)

Some unscrupulous advertisers appear to be promoting the Plus/4 and C-16 as either Commodore-64 or C-128 compatible (or both). They most definitely are not! Only the most "generic" BASIC programs for the C-64 will run on the Plus/4. Any that use POKEs, PEEKs, or other machine language calls are definitely out. This includes the vast majority of commercial programs written for the C-64.

Yes, the Plus/4 does have some commercial software of its own. But, remember, when the machines are gone, and the limited existing stores of programs are depleted, it is very unlikely that you will ever see any new software for these machines. (Then again...I could be wrong...look at how well the discontinued TI-99/4A has hung on.)

I have had people call me in just the last few weeks who had already bought the Plus/4, or were thinking about it. All of them thought that it would run C-64 software. I had to talk them out of the system, after they were already sold on it.

I'm not saying the Plus/4 or C-16 are totally worthless. For "computer literacy" type use they're OK. You could certainly use them to teach yourself BASIC programming, or whatever. If you can be content with the Plus/4's limited built-in software, then that's fine. If someone is buying a Plus/4 or C-16, fully aware of its compatibility problems, then that is their business. Most people, however, don't know *what* they are buying.

If I were Commodore, I would stamp across all the Plus/4 boxes, "Caution: This computer is **not** compatible with the C-64 or C-128. Buy at your own risk!" It might mean that the machines would be a little harder to sell. But, at least it would mean that several thousand customers wouldn't be mad in a few weeks when they realize they have been "taken."

I know that most of the readers of this column are already aware of this situation, but I think we should be careful to warn others who may be thinking about getting a "good deal" on a Commodore. We may help keep Commodore's reputation a little cleaner among those who aren't aware of what's going on.

The MPS 1000

The Best "Low Cost" Printer Ever From Commodore

While I have sort of criticised Commodore for their handling of the Plus/4 close-out fiasco, let me add a plug for an item that I've been very impressed with since the first time I saw it in a local discount store. I'm talking about the new Commodore MPS 1000 printer. It's a nice machine at the right price.

Basically, it's an enhanced Epson LX-90. Internally, they are the same machine and use the same ribbon. But, unlike the LX-80 and Epson Homewriter, the MPS-1000 includes both tractor and friction standard. The rated speed is a conservative 100 cps. The thing also has a credible near letter quality (NLQ) mode at 25 or 30 cps.

The real kicker from my standpoint is that the printer is both a Commodore graphic printer (1525, 801, 803 compatible) and IBM graphic printer compatible. It even includes both a Commodore serial port and a Centronics parallel port. It works with the VIC, 64, Plus/4, C-128, and the Amiga and all IBM and "Clones" (like a certain Z-150 I know, he he).

Anyway, the docs and the machine are far better than anything we've seen from Commodore for a long time. Especially at the discount price of $219! (Retail is probably $250.)

Parallel Printer Driver Version 3.0...Almost Ready!

Whew! Version 3.0 of the driver program is almost done. I hope to have the C-64 version ready for next month's column. It has taken longer than expected (typical of most software projects). I hope version 3.0's features make up for some of the wait.

Several new modes have been added to the interface program. Here's a run down of the new features:

1) Totally self-relocating. The printer driver, when run, automatically relocates to the top of BASIC RAM and protects itself. You can also "force" it to relocate anywhere in RAM you desire.

2) Automatic "PETSCII" to "ASCII" conversion mode. You can print Commodore text files on your ASCII printer without having to convert them to true ASCII files first. Upper and lower case translation is done automatically by the driver program.

3) Transparent mode for graphic programs. Many dot matrix printers' special graphic features are accessible, using the transparent mode. This allows you to send bit maps and other graphic data. This may include hi-res screen dumps and other graphic functions.

4) BASIC listing mode allows BASIC programs to LIST correctly on an ASCII printer. This feature will convert the

continued on page 99

Commodore Mailbag

by Ted Drude

Because of the high volume of reader mail, we are going to start a separate section this month called "Commodore Mailbag". If enough mail keeps coming in, we may see this as a regular feature of our Commodore section. It's up to you to decide whether we keep this or not.

I want to thank everyone who has written in, and encourage those of you who haven't, to do so. You don't have to *write* a formal business letter to get published. A legible postcard is just as good. The main thing is write and let us know what you are thinking.

This is your chance to ask questions, air your views, and share your vast store of helpful hints and tips with rest of us. The best way to make sure you letter gets published is to be reasonably concise and ask questions or make comments that you think will be of general interest to others.

Send any and all questions, comments, and advice about Commodore computers and peripherals to: Ted Drude, Commodore Mailbag, c/o *Computer Shopper*, P. O. Box F, Titusville, FL 32796.

All letters to the above address become property of the *COMPUTER SHOPPER* magazine. (That just means that we reserve the right to edit lengthy letters and reprint them as we see fit. We will be very careful to preserve the substance of your letter if it's selected for publication.) If you want a *personal* reply to your correspondence, you *must* include a stamped self-addressed envelope (SASE). Because of the volume of mail, and staff shortages, any request for a direct reply without the SASE cannot be fulfilled.

Again, thanks for your input . . . this is really a column that belongs to all of *you*. I'm just here as a participant and observer. Let's have fun and learn together!

Hard Disk Project Mail

A lot of the correspondence we have been receiving in the past few months have been comments on the C-64/128 hard disk project that I've talked about from time to time. While there has been just too much mail on this to publish each and every letter, I'd like to acknowledge my thanks to everyone who has taken the time to write us on this subject. Your letters are on file, and they have been very helpful.

So far, several things have been mentioned over and over in the letters we've received. One item is that there is much interest in a SASI/SCSI host adapter for the C-64/128. We will be publishing the plans for just such a host adapter later this year. Expect an announcement on this sometime this spring or summer.

There has also been a lot of interest in connecting an IBM PC or PC clone to a C-64/128, and allowing the Commodore to operate the PC's hard disk (sort of like an 8-bit co-processing system). A project for that is also in the works, and will probably be published later this year.

A third theme that has come through in your letters is the fact that price is a sensitive issue and whatever we do, keep it as low cost as possible. We will definitely be keeping cost considerations in mind, as we continue with these projects. Thanks again for your input.

Accessing Delphi's Amiga Subgroup

Q. "Could you please send me a list of Amiga information services . . . and the address of the Delphi Subgroup "Starship Amiga"? I do not yet have an Amiga, but am seriously considering it."

John Ammons
Knoxville, TN

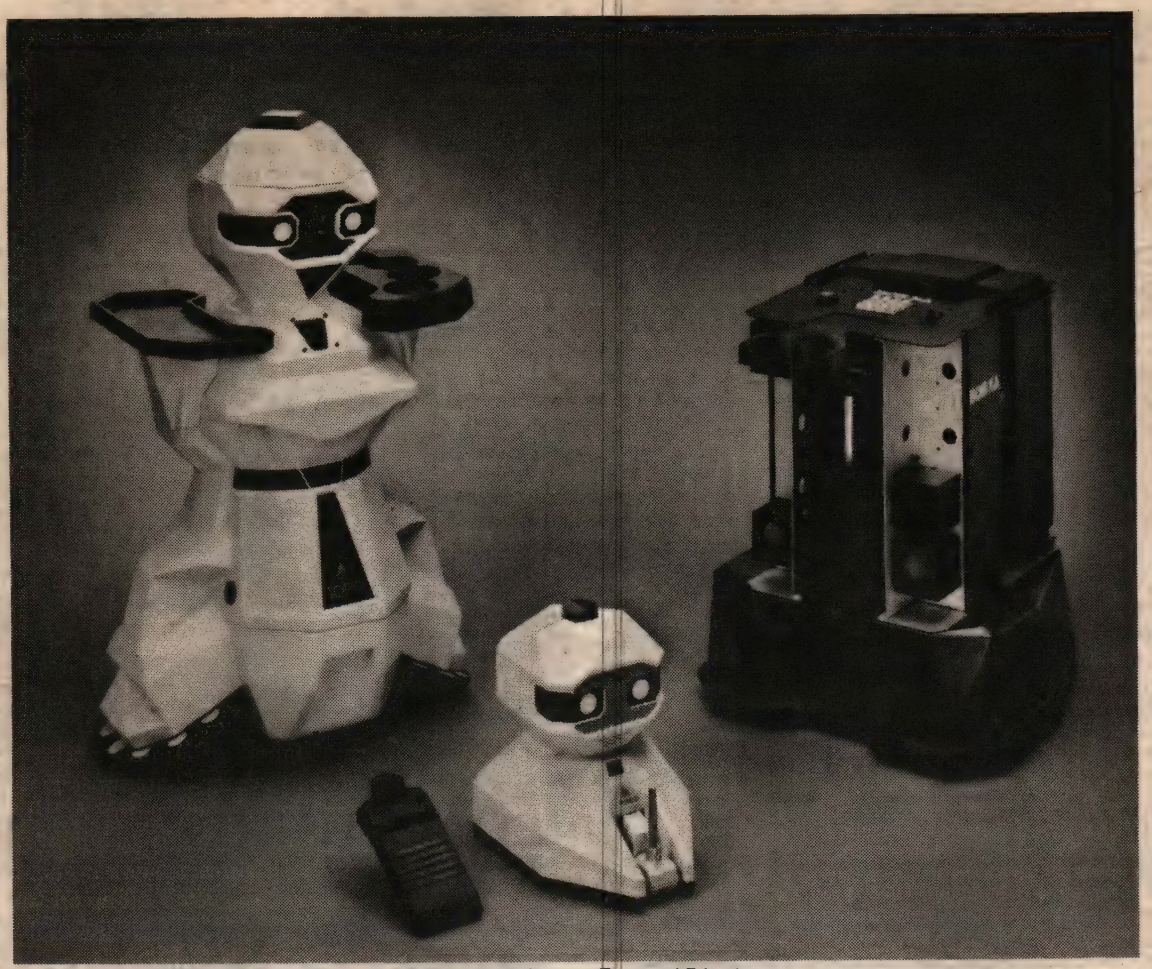
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ROBOTICS

Probots And People — "Big Robots"

by Tim Knight

Although small robots like the Omnibot and Hearoid are popular, many peope wonder when the *big* robots like R2D2 are going to be available. Actually, quite a few big robots are already on the market, but none of them have done very well in terms of sales. This month we're going to take a look at these robots, and consider why they haven't enjoyed the success of the smaller robots.



Androbot's Robots — Topo and Friends

Hero-1 and Hero Jr.

The first personal robot introduced was the Hero-1. Made by the Heath Company, Hero-1 was presented in 1982 as an educational robot (its name is short for Heath Educational Robot) that could be enjoyed by hobbyists. Heath definitely recognized and captured a small market for these robots, and around 8,000 of them were sold, mostly in kit form for $1,295, although an assembled model could be bought for $2,495. The people who bought the kits spent an average of eighty hours putting the Hero-1 together.

Hero-1 was not promoted as a "personal robot." Heath recognized that the robot didn't have much utility around the home, but they did know that it was an educational tool from which people could learn a lot about robots in general. Hero-1 could travel around, talk, detect sound, motion, and heat, and measure distances, and it had an arm that could lift objects weighing as much as a pound. It was fun to experiment with, and it served its purpose well as an educational tool for those who wanted to know more about the world of robots.

However, when Heath began receiving national coverage for its "personal robot," they perceived that a market for a less expensive home robot might exist. Therefore, they took the arm off the Hero-1 made some software ROM cartridges that could be easily plugged into the robot, and introduced the Hero Jr. It was sold as a true "personal robot" and had all of the features of Hero-1, less the arm. Unfortunately, the Hero Jr. was anything but a success story, despite the money Heath put behind selling it.

Although a small hobbyist market for robot builders does exist (and Heath met that demand with the Hero-1), the Hero Jr. flopped for a number of reasons. First of all, few people could justify paying $1,295 for a machine which couldn't do anything useful. It could certainly do *things*--it could talk, move around, measure distances--but these are rather limited features which haven't been integrated into any useful application yet. Moreover, I observed countless times people at Robot Center staring at the Tomy robots, noting how attractive they were, but when they noticed Hero Jr., they asked "what is that?" Although the Hero Jr. has far more powerful electronics than any of the Tomy robots, it still looks like a box with a few buttons on it, and does not meet the public's idea of how a robot should look like. Had Heath put a plastic body over the Hero Jr., changing none of the electronics inside, probably a larger number of Hero Jrs. would have been sold.

RB5X, Androbot, and Hubot

Other "first generation" personal robots also participated in the false start of personal robotics. In 1983 and 1984, a number of companies poured millions of dollars into robots that everyone realized couldn't do anything. Instead of letting the market grow slowly and naturally, people jumped into the business expecting to become the overnight computer field millionaires they had heard about. The obstacle, however, was that hardware and software technology and public demand for robots had not begun to grow to the point where a personal robot market could thrive. Personal computers took a long, long time to reach the mass market, but for some reason companies like Androbot, RB Corporation, and Hubotics appeared overnight and expected millions of dollars in orders. Let's take a look at each of these robots and examine their redeeming qualities, their shortcomings, and what can be learned from them for future robots.

The Androbot line originally consisted of *four* robots (talk about faith in the industry) called AndroMan, F.R.E.D., Topo, and B.O.B. AndroMan was a robot that was supposed to interact with the Atari 2600 game system, but he never materialized. F.R.E.D., a turtle-type robot that could draw and speak, cost about $500. He, too sold in very small quantities and never made a strong showing. Topo has undergone countless changes, but he currently costs $1,750. He can move around, speak, detect obstacles, and carry food and drinks with his tray. Topo has to be controlled by a computer, but his infrared interface allows him to run around without a cable attached to him.

B.O.B., the most sophisticated of the Androbots, has also gone through quite a few changes. Now costing about $7,500, B.O.B. has sophisticated sensors that allow it to move around independently. In addition, it has a lifting mechanism that can pick up objects weighing up to sixteen pounds. B.O.B. originally had the same attractive design as the smaller Androbots, but was changed into the box-like shape of Hero Jr. to be more practical.

Androbot's future is questionable since it has been bought and sold a number of times and has just recovered from bankruptcy. However, a few valuable lessons can be learned from Androbot whether it survives or not. First of all, the body design of these robots was excellent. The sleek, almost humanoid figures were not only functional, but attractive as well. In fact, if the features of the Hero Jr. were put inside the attractive Topo shell, it might become a fairly popular personal robot. Androbot also taught those developing new robots that self-contained machines, like B.O.B., were more practical than "slave" machines like Topo, which requiring a personal computer, narrow their potential market.

The RB Robot Corporation was formed at about the same time as Androbot and Heath's Hero-1. RB has also gone through Chapter 11 proceedings and has since been purchased by Androbot. Why one ailing company bought another is anyone's guess, but the RB5X robot has received quite a lot of press coverage and has a few features that might be useful on future personal robots.

RB is obviously patterned after the Star War's R2D2 robot. Its stubby body and circular dome house a built-in computer and eight bumper switches. RB can talk, move, detect when it has bumped into something, and flash its lights. Again, people couldn't justify spending $2,495 for a robot with no practical uses, especilly when its arm cost an additional $1,295. Not to say that the company didn't try--they introduced a $24.95 software package that made the RB ask children simple arithmetic problems with the children responding by pressing the bumpers. This, it seems, is not the future of personal robotics. However, some of the add-ons RB Corporation was planning, such as a fire detector/extinguisher and vacuum cleaner, may be useful in the future.

Finally, the Hubot from Hubotics, Inc. is a consumer's electronics paradise. This 44-inch high robot features its own television, stereo, Atari 2600 system, CP/M computer, and voice synthesizer. Hubot is essentially an electronics rack with wheels. It is interesting to have a mobile computer and entertainment system, but such things as an Atari 2600 and

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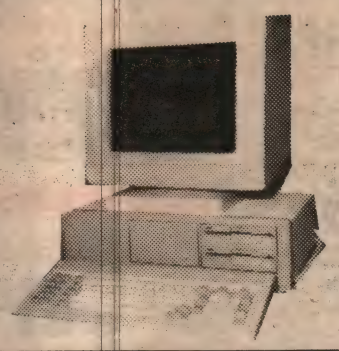
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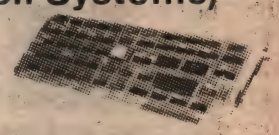
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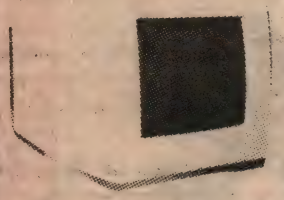
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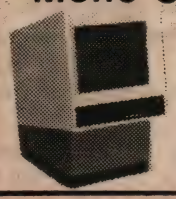
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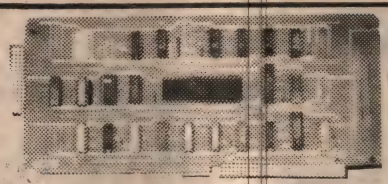
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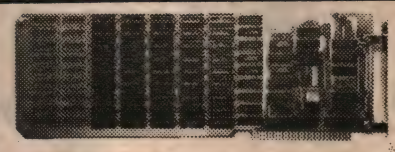
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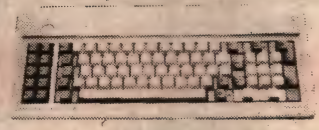


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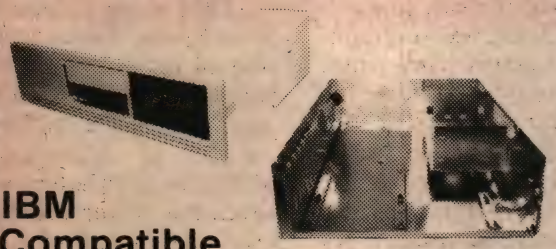
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SANYO

The Silver Box

Do I Want A Hard Disk?

by Richard T. Fujita

If I had to keep a customer file listing of a thousand names with all the sales records and billing addresses under each name, I would buy a hard disk now. A hard disk is nice because you wait only a moment or two to get back 10 to 60 Megabytes of data.

However, I have a theory that Winchester drives will probably be obsolete after 1987! One problem with disk drives is that you have to keep backup files, either on tapes or on floppy disk or you may lose all your data in one mishap! Of course it is nice to retrieve data in a second or two and to be able to keep all your data within reach. Keeping track of so much data, in one place, is not easy for me. I am now struggling with a directory of 70 files. Pretty soon I will have to have a data base file cataloging all my files stored on numbered floppies. I can't imagine what I would do if I had 3,000 files with many layers of subdirectories!

Anyway, there is a faster data retrieval system. That is the RAM-disk . It's speed totally depends on CPU and somewhat on how the program is written. The price is certainly low. The 256K DRAM chips cost $2.50 to $3.00 each in the retail market. Thirty two chips can give you 1 megabyte for about $100! The only problem is that this storage is volatile, when you turn off the power, it disappears.

If you have one megabyte, that would be enough for most applications for your computer. RAM works almost instantly and it is definitely faster than the fastest Winchester! With one to two megabytes you could fit your word processing software and all your work files into this RAM "disk." Newword, Word Plus Checker, and some other utilities I use to process a text file and copy it to floppy disks use about 479K of RAM. Even a trimmed version does not fit onto a 360K system disk. I had to delete the printer driver and put it on the data-file disk, to fit the programs into a 360K system disk. At boot time, the AUTOEXEC batch file reads all necessary modules into the ramdisk and starts it.

Is CDROM Read Only?

The reason I say the Winchester drives are going to become obsolete is the coming of the optical CDROM with perhaps 500 mega-bytes capacity. The price of the optical CD-ROM should be cheaper than Winchester drives, simply because the CDROM is based on the entertainment electronics technolgoy which produces quantities in many millions, compared to limited quantities the computer industry can use. The price of CD Memory Drive should be about equal to audio CD Players, or less if you consider the internal circuits. The digital computer circuits are less complicated than the digital-to-analog (DA) conversion circuits used in the Compact Disk Players. This means a realistic price three years from now could be about $250 to $350 (perhaps including a write function).

You must not be confused by the name. CDROM is not necessarily read only. It can be made to CDPROM, also called "WORM," write once read many times memory. Since you can have 500 Mbytes, you can overwrite the directory and in effect erase the files however, you cannot reuse the erased space. You have so much space at your disposal that you can throw away half of it without missing it. The record is permanent and basically much safer than the data stored on the hard disk. The only draw back I can think of is the access speed, but use of light weight, mirror with voice-coil actuator

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Cornerman

by Michael Ecker

Sidekick For The Sanyo

By now, most *Computer Shopper* readers (sophisticates that you are!) are familiar with desktop background organizers with pop-up applications. Best known of these is Borland's Sidekick, which evidently will run on your Sanyo 550 or 555, provided you have a video board and appropriate patch.

Most such programs have been modeled along the same lines. Thus, most of these contain pop-up calendars, a calculator, notepads, an ASCII table, and a dialer for your modem. Most of these programs are background memory-resident applications, meaning they can be activated in the middle of a BASIC program, a word processor, a database, or a spreadsheet. Upon completion of the activity, you escape back to where you were before the organizer program was invoked.

What About The Sanyo?

Nevertheless, most Sanyo users would like a program that does these things in a way that respects the particular architecture and features of the Sanyo. Thus, many of you want a program made expressly for the Sanyo, not an IBM or MSDOS one "ported over."

Such a program is MichTron's Cornerman, which MichTron in the program's documentation, affectionately refers to as "C-Man."

Readers who have followed my reviews here already know that I am fairly fond of most of MichTron's programs. True, I often have criticisms, but providing such is part of the job of a reviewer.

In this case, my reaction is mostly pleasant. Cornerman is basically as advertised "Sidekick for the Sanyo." C-Man comes equipped with the five most expected applications, activated by the keys indicated: PF1 for ASCII table, PF2 for calculator, PF3 for calendar, PF4 for notepad, PF5 for dialer.

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A Snapshot of "Snapshot"

Reviewed by
Dr. Michael W. Ecker

Snapshot is the latest entry into the screen-dump programs sweepstakes for Sanyo 550 series computers. Yes, I know that's a very worn out phrase, but for newer readers, let me spell it out. A screen dump program, or utility, allows you to "dump" the contents of your screen onto your printer. The reasons for needing such a dump might include having a sample screen in a software manufacturer's instruction manual, a book of programs and so on. You need software to do this because your Sanyo 555 can't do it alone. This particular entry comes from Key Software Products, the same company which produces Player Piano, a program for making music which I reviewed earlier.

Snapshot's claim to fame seems to be its ability to produce shades of gray. If you want a very sharp, black image, as I did for a cover page for my own software, it is no problem; all the popular screen-dump programs on the market will do this for you.

I received the pre-release version; the manual had not yet been typeset. Consisting of perhaps a half dozen pages or so, it was easy to follow. Running it was easy, too. First thing I did was make a backup copy, a practice you should follow with software that isn't copy protected. Before running it, though, I had to install it. This is actually very easy. From the system level / DOS Ready prompt of A>, type in SNAPSHOT followed by the letter corresponding to your printer type. Most of the major printers seem to be included in the list. To get the list, type just SNAPSHOT (not followed by a letter).

Once installation is completed, you are ready to use it. You can dump text or graphics — as indeed most screen dumps allow — and from the system level, BASIC and perhaps application programs. I worked only with BASIC, but there is no reason to believe that the program would work differently or fail to work in other environments. When dealing with only text, everything is printed out as it appears. However, when printing out graphics, the screen's contents come out sideways on the printer, allowing the full screen to be printed out. Thus, if your program uses Sanyo's Symbol command for producing large-sized letters, you will need to use the graphics version.

Before I describe how to do this, let me add that it is not at all unusual to have sideways print outs. I have copies of MichTron's Freeze Frame and A-OK Computer's PrintScreen 550, so I was not surprised to see a rotated print screen.

It is difficult not to engage in some comparisons. After all, the question of how good a product is should be answered in two regards: 1) Does it do the job? and 2) How well? The second one depends to some degree upon what is possible, or what else exists. As it turns out, I found all three to be highly commendable. Of the three, only A-OK's seemed to allow a non-rotated graphics dump, which I liked. On the other hand, you have to buy A-OK DOS to use it (PrintScreen 550). Freeze Frame was very nice all around, and I would have to say the same for Snapshot. The claim to fame of "stripes" or shades of gray belongs to these latter two. All screen-dump programs seem to take quite a bit of time to dump graphics, and Snapshot was no exception in the speed department. ASCII (test) dumps, however, are very fast.

Snapshot, like its competitors, operates directly from the keyboard. Thus, you can get a screen-dump of text with the key combination of Control-Shift-1, for ASCII mode (provided you've installed Snapshot before you try to use it, of course). For graphics, use Control-Shift-4, the so-called enhanced-color mode. Control-Shift-2 and 3 produce B&W and color graphics, the latter giving a "stipple pattern" based on the colors you are using. This applies even if you use a monochrome monitor, as I do, in which case the color commands affect the intensity

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Speed Screen

Speed Up That Slow Screen

by Dr. Michael W. Ecker

Have you ever noticed how slow the Sanyo 550 and 555 scroll data are compared to other computers? Try LISTing a Basic program and you will see what I mean. On the average, the Sanyo takes about three times as long to scroll data as other machines require.

The reason for this is that the Sanyo outputs RGB (red green, blue) signals, with the computer having 48K video; that's 16K per color. The point is that it requires time-consuming processing to handle this, even if a monochrome monitor is used.

To defeat this and to allow faster processing, Michigan Software offers Speed Screen. Bear in mind that since this program is going to bypass the red and blue portions of video, outputting only the green, there will be faster output, but not much in the way of color. Thus, if you wish to have color in a particular application, do not use Speed Screen for such sessions at the computer.

Speed Screen In Action

Speed Screen comes on an unprotected disk, with two pages of instruction and information. Don't let the small size scare you; this is a useful and easy program. The instructions advise how to make a backup even with only one drive. They also show how to create a CONFIG.SYS file (not as scary as it sounds, by the way).

To invoke Speed Screen, assuming it's installed as instructed, there is nothing to do. It is part of your system. However, you can "unplug" it by typing, from DOS level (the A> prompt), SETSPEED/S and touching the Enter key. Reactivate it with SETSPEED/F and Enter. If you're not sure of the mode you're in, type SETSPEED.

A lagniappe — that is, a nice bonus — which comes with Speed Screen, is a program called, aptly enough, SETBELL. I say that because it sets the tone of the honker on the Sanyo. Annoyed at the irritating noise Sanyo calls a beep? Experimenting with this program and enjoy the change.

Specifically, understand that the bell program is set automatically each time you boot up using a disk with Speed Screen installed. However, you can easily alter the tone (numbers allowed are 16 through 500), the duration of the tone (0 to 256), and the volume (0 to 8). Experiment to find the most enjoyable. Then save the result as part of an AUTOEXEC.BAT file, if you don't wish to type in the changes each time. (And who does?)

Summary

At $24.95, this is a sleeper of a utility. It's not high-powered or sexy, but it does address two important matters for Sanyo users: the slow scroll and the unpleasant noise. This price seems to be reasonable for what you get. But remember to deactivate Speed Screen if you plan to use color programs.

Speed Screen
Michigan Software
43345 Grand River
Novi, MI 48050
(313) 348-4477 ●

Silver Box
continued from page 57

around it may change this. With this WORM we will have a new era. You could keep all your records on the WORM which is transportable. You would edit and write on the RAM disk at the top speed of your CPU, and then would transfer the data to the WORM where you have unlimited space for application programs and all the data you want to store on the WORM disk! You would only need floppy disks for software distribution. All of your own files will be kept in one or two optical disks.

RAM Disk On The Sanyo

The important point in using Ram-disk on the Sanyo is that its capacity should be nearly equal or larger than your floppy drives. This means you must have a RAM capacity of at least 592K which is slightly beyond 512K, the maximum presently available in Sanyo VB512, the color board with the RAM expansion. (You can extend it to 640K if you install eight sockets and eight 256K Drams on the board.)

I arrived at the value of 592 based on simple calculations, the 380K needed for the 360K Ram-disk (although I prefer to have 384K Ram-disk capacity if the particular Ram-disk program being used permits this) plus 128K minimum for the application programs, plus 40K for the system programs and another 40K to be reserved for the print spool and for Sidekick. These add up to about 592K or nearly so.

The next boundary of RAM space from 512K is 640K. The maximum accessible by the MSDOS. With 640K RAM space you can set up a 384K Ram-disk. Beyond this you have to have memory bank switching to switch out everything beyond the certain segment and switch in a new section of 512K. One question is whether the Sanyo color board permits this. Does anybody know if there is such a switch in one of the LSI gate arrays used in the VB550? This also leads us to one more problem. What are you going to do about the BIOS ROM placed at the Segment F000H? I think we can disregard the two pages of color RAMs sitting in this Segment completely forgotten and mostly ignored.

To get the 1,000K bytes we must switch it in two sections of 512K RAMs. My present need is a large RAM-disk. I may not need to conform to Intel/Lotus switching scheme.

The reason why you cannot get the whole 1 megabyte of RAM switched in-and-out at once is because you must have your application program image (or continuation of it) in the switched portion as well. Otherwise, the CPU will simply crash or hang. The question is how you put the image there without partial switching of the memory? If you think you can do it, I'm interested in knowing your ideas.

In an MSDOS machine, you cannot memory use beyond the Segment 9000H. The MSDOS will not access Segment A000H. Your software can, but not the MSDOS. This is why the limit is 640K. A friend asked me how to utilize 384K available in his multi-function board. He has 512K in his mother board. The best he could do was to put three rows of 64K ram on the multi-function board and set the base segment address at the highest setting which is 7000H.

This gave him total of 640K, but not one byte more. The multi-funciton board does not have any switching hardware. The total RAM he could install was 192K, of which only 128K is effective. The first row is the duplicated memory, but without this row, parity error will result, because, both the mother board RAM and the expansion board RAM buffer are active in the Segment 7000H. The two banks of the RAM in this Segment must work together, or an error will show up and the DOS will not use any RAM beyond that point. Your application programs such as RAM-disk can use this memory there if so programmed.

The New VB512

This long awaited board still has not come in. Sanyo has just called to tell me to wait a week or two to get the evaluation sample. As I mentioned somewhere above, the board has eight sockets to accept eight 256K Drams. The added 256K bytes extend the total memory to 512K combined with the 256K you have on the mainboard. The name 512K board gives a false impression. By installing another row of eight sockets you may have 512K on board, of which MSDOS accesses only one half the RAM space offered by the last row of the Drams. The on-board logic kills the RAM in these segments, namely from A000H:0000H to BFFFH:FFFFH. I will explain more about the decode logic on this board when I get the evaluation sample.

All I am saying about this board is what I learned from the circuit schematic, not by actual operation of it. I may be wrong, or the real product may have incorporated some new changes I do not know about at this time. If you get this board I recommend that you install the second row. You might need it if you use a RAM-disk. The additional 128K you get by this installation may make a great deal of difference for you.

This board may be a good board, but I lament my decision of buying the VB550. I need a whole lot of RAM space, but shall I put my VB550 in my junk box filled with 15 years of refuse, dust and dirt together with some old memory boards having 1 msec access time and drawing 3.5 amps for each 8K bytes of RAM? This is a hard question to answer, similar to the question of forfeiting the high resolution color screen. The $399 projected list price is also not too easy to swallow.

Special Event For Memory Boards

I hereby invite all companies who make memory expansion boards to send me one of their boards for an evaluation. I want to keep the board for about four weeks and write a report for each board entered in this evaluation event. I shall not call this event a contest, but lots of our readers may benefit from my report. I believe the 640K RAM expansion must come before the hard-disk which might have an unexpected short life in your machine, not because of the rampant hardware reliability problems in the IBM world but because of other circumstances.

The Rams In Sanyo

When I looked up the circuit schematic on the MBC-555-2, I was disappointed to find that the superb color screen of "Silver Box" is constructed with a very unusual circuit trick. My Sanyo MBC-555 may be kluged to go up to the second 256K section but not higher without drastic rewiring. The highest segment the screen can be replanted without major surgery is at 7C00H but not beyond. To go higher than that boundary, a software

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A Snapshot
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on your screen — and, consequently, the screen-dump result produced by Snapshot.

You can invoke Snapshot under program control (as you can with the others). Snapshot's documentation has more information on this than I could possibly want, and that is a strong point.

One nice feature is a graphics box to help define the part of the screen you wish to dump. I can imagine that one would have many creative choices for using this in conjunction with Sanyo Basic's Window command, for instance. One tip about graphic screen dumps (for all such programs): If you use a C Itoh 8510 (Prowriter) or others, you should check to make sure you set the dip switch (1-8 on the Prowriter) for single spacing, or else the dump will be broken up with horizontal bands of white.

In summary, this program is one you should consider buying if you do not have a screen dump program and might use one (and who can't, right?). It is well supported by Key Software, competitively priced with competitive features, easy to use, and it functions as intended.

(Key Software Products, 440 Ninth Ave., Menlo Park, CA 94025; (415) 364-9847, for all Sanyo 550/555 computers with printers, $34.95 + $1.00 shipping and handling; CA residents add 6.5% sales tax). ●

TEXAS INSTRUMENTS

The New TI Forum

by Jonathan Zittrain and Ron Albright

The Year In Review

What? A "year in review" article in the middle of spring? Since we are new to *Computer Shopper*, we thought it best to start off with a short bit about what is going on in the world of TI 99/4A and, by doing so, perhaps give you an idea where we are going.

The first thing we want to do, right off the bat, is to solicit letters. We want to hear from any and all TI 99/4A users with a problem, with a question, or even without a problem or a question. The strength of the TI community throughout our stay in the "computer orphanage" has been the willingness to communicate and give help and advice to other "orphans." Let's keep that going. We hope to serve as an up-to-date conduit for information, views, and reviews. If you have a technical question, we'll answer it. If you have a programming question, a software question, or whatever, likewise. With your input, we can make this column everything we hope it can be. Above all, it will be fun for all. **That** we promise.

Anyone who thinks that the users of the 99/4A are to be pitied for being so rudely abandoned by the mainstream of the computer industry is to be pitied themselves. The year that just passed was the most exciting, innovative, and fun year in the history of our machine. Let's recap a few reasons why we think this is true.

1985 started on a bit of a discouraging note. It had become apparent that Corcomp would be unable to produce the rumored 9900 upgrade machine (dubbed the "Phoenix") and that we would have to rely on our /4A consoles indefinitely. Just as the "rumor from the West" was dying out, the new "rumor from the East" started. Myarc (of New Jersey), while steadfastly not confirming (if NOT denying) the rumors, would be producing a new, larger, 9900-based upgrade for the TI community. The rumors were eventually picked up by Ryte Data in Canada, which even sold subscriptions to a periodical "fact sheet" for the dream machine. Finally, at the 3rd TI Fair (sponsored by the Chicago Users Group in November), Lou Phillips, president of Myarc, made public plans for the new machine. While production setbacks have slowed the release, the machine is still expected sometime in early 1986. We won't go through the machine's details since they have been well publicized, but it will, if it arrives, be a real honey.

What about other hardware for the TI 99/4A? Well, how about a 512K memory expansion card (from the same Myarc, 241 Madisonville Road, Basking Ridge, NJ). How about a plug-in console device that will (1) allow you to back-up and modify our cartridge collection, (2) write code in the macros of GPL (Graphics Programming Language), and (3) keep the elusive GROM memory of certain cartridges (like Microsoft's Multiplan) and ROM memory in the device for immediate recall (the Gram Kracker, Millers Graphics, 1475 W. Cypress Ave., San Dimas, CA). Not to mention the incredible prices on surplus hardware for the TI consoles that makes replacement of keyboards, power supplies, RF modulators, and the like cheap and easy (see the pages of *Computer Shopper* for the suppliers). Boy, its tough being an orphan!

You want languages for programming? How about PILOT, small C, and a new Extended BASIC with full graphics commands. Those to go along with our BASIC, UCSD Pascal, Forth, Assembly, and CP/M. Want terminal emulator software? How about Fast-Term, which is Fairware, or 4A/Talk (DataBiotics, P.O. Box 1194, Palos Verdes Estates, CA) both of which support ASCII, XMODEM and TE2 transfer protocols. Need a database? How about PRBase (Fairware). Utilities? Explorer and Advanced Diagnostics (Millers Graphics), XB Detective (Utilitee Software, P.O. Box 7275, Dearborn, MI), Disk Manager 1000 (Fairware), and Disk + Aid (from Thomson D.I.P., 1461 Beach St., Muskegon, MI) will probably fill anyone's needs. Like to use graphics? Try Graphx (available from Thomson D.I.P.) or TI Artist (Incesbot, P.O. Box 260, Arnold, MD). Can't draw, but need the artwork? Asgard Software (P.O. Box 10306, Rockville, MD) has made Companion I and II for Graphx, and Incesbot and Dave Rose have made Artist's Companion for TI Artist fans (available from Texaments, 53 Center St., Patchogue, NY). Word processing your bag? TI Writer is now possible to use without the hard-to-find TI Writer cartridge through a variety of loaders from Extended Basic or Editor/Assember. Want to read about technical information or product reviews? We still have two pulications devoted completely to the 99/4A users. MICROpendium (product reviews and news; P.O. Box 1343, Round Rock, TX) and Super 99 Monthly (technical/programming information; 171 Mustang St., Sulphur, LA) are monthly, jam-packed, and on time. Of course, *Computer Shopper* has continued to support the TI owner-base all along. National telecommunication network support? The TI Forum (Compuserve), TEXNET (The Source), and TIIN (Delphi) are flourishing and absolutely brimming over with information, on-line help, and program downloads. To our amazement local BBSs continue to spring up new all around the country. By our count, there are at least eight different BBS systems running on the TI, two are public domain and a few more are Fairware. Life is hard as an orphan. (If you have any questions about the products we mentioned, drop us a line here at the *Computer Shopper* and we will answer them...we promise!)

What we are trying to convey is that, if you spent 1985 lamenting the demise of your 99/4A investment and moaning about the lack of support for your machine, you must have had your head deeply in the sand. Our community is alive and well, basking in the warmth of mutual support, ingenuity, and plain old "chutzpah." We revel in the incredible tenacity of the TI users who have continued to amaze the industry with their ability to keep the /4A productive two and a half years out of production. Our hats are off to you, gang.

So You Want To Be A Sysop!

Are you really ready to take

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5 *New* Programs For The TI-99/4A

QS-RAMDISK

Turn your foundation 128K card into a true, 127 file, RAM disk, with no file-size or file-type restrictions. You can have sequential files, large Ex. BASIC programs, etc. All the capabilities of a SSSD disk, only at RAM disk speeds. Read, write and save to the QS-RAMDISK exactly as if it were a regular disk drive, using all the normal BASIC commands. No new commands to learn. Written in Assembly language. The most incredible new program in years. At last you can really use the full capabilities of your 128K card. Save time, save money. Order now! Req: Foundations 128K card, with DSR option (not disk file emulator) only $49.95

Banner Maker

Print signs in large letters, up to 6" high, either horizontally or vertically. Upper and lower case letters, numerals, punctuation marks, special characters ($, % ,&, *, ?, ! etc.), plus ten pre-defined characters. You can even design your own characters, and then print them in large size. Fast and easy to use. Lots of fun. "Happy Birthday, John!", etc. Req: Any printer, only $19.95.

Softkeys

Create your own programmable function keys! Save time, eliminate typing mistakes. Define ten keys to be any commands you want, up to 140 characters each, e.g.

SAVE"DSK1.
or LIST
"RS232.BA = 4800.DA = 8"

etc. Thereafter, only one keystroke will instantly enter the entire command. A great time saver. Written in Assembly language. Only $29.95.

Screen Dump II

A fast, easy, resident, screen dump program. Written in Assembly language. Print the screen, in normal or full-page size, in only seconds, by simply pressing a key. NO programming required. NO hardware modification required. Load it once, then it is always ready for instant use, at any time, from your BASIC or Ex. BASIC program, or from command mode. You control which column the print out will begin in. Print the screen of certain modules, when used with a Load Interrupt switch (sold separately). Req: TI, Epson, Gemini, Panasonic, Canon, or Prowriter compatible printer. Only $29.95.

Disk Manager IV

The *only* resident disk manager program! Can be operated from command mode or from your program! Load it once, then it is always ready for instant use, at any time. No more swapping modules, or loading a special program, just to catalog a disk, initialize a disk, change file protection, etc. Do it all instantly from command mode, or even in your Ex. BASIC program. A great time saver. Also saves wear and tear on your console. Now, with all the capabilities of the disk manager module (except disk tests), including copy a file to an existing disk, and backup a disk (full or selective) to an existing disk. Unfractures files, too! New help command included, plus a menu-driven option to make it even easier to use. Written in Assembly language. Resides in the Assembly language portion of memory, does not reduce the amount of space available for your BASIC program, or disturb it in any way. Works with all disk controller cards. Only $39.95.

All programs in this article require disk, 32K, Ex. BASIC.

For further information contact Quality 99 Software, 1884 Columbia Rd. #1021, Washington, DC 20009. ●

The New TI Forum continued from page 59

the dive? To dedicate a computer and a phone line to unknown strangers who will call your house at all hours of the day (and night) to trade information with other strangers?

Bulletin board systems, affectionately known as BBSs, have been springing up at a fantastic rate across the country, and those that cater to the TI99/4A are no exception. One person or a group of people will sponsor a BBS, with a SYSOP (usually the person whose house the BBS is in), or SYStem OPerator, who watches the proceedings of people leaving messages, programs, and other assorted information to each other. BBSs can be specialized around a specific topic (like TI 99/4A computers) or simply be a general meeting place, one user at a time, for those whose computers are equipped for calling.

Being a BBS Sysop can be a unique and wonderful experience, but there are some pitfalls along the way you should be aware of before you commit yourself to setting up and running a BBS.

First, you will need a dedicated phone line and computer. Many BBSs are up 24 hours a day, and most keep long hours so that many people will have a chance to call in. This means that you will be putting your computer through some marathon sessions.

The TI Peripheral Expansion Box with its fan should be fine for these heavy-duty uses, but the console should also have a fan somehow attached to one of its vents. You've probably noticed how hot the space in front of the cartridge port can get (I use it to keep my coffee warm), and after hours of use, the plastic will reach its melting point. In any case, do not be surprised if some components fail after a while. You will be using them heavily, so having spare key parts around would be a good idea.

As a Sysop, you will be doing quite a lot of work. You must be sure that the board is functioning properly, and you will also need to keep an eye on messages and program submissions. The legalities of running a bulletin board are still being fought in the courts now, and it appears that Sysops may be responsible for the content of their bulletin boards. This means that a complete stranger can access your board, leave a libelous message, and someone may try to hold you responsible.

That is another characteristic of bulletin boards to be aware of; BBSs tend to bring out the best and the worst in people. The anonymity of the callers can lead to impolite and heated exchanges, while your efforts as a Sysop to provide a quality BBS go unnoticed. In fact, many Sysops have to go to extraordinary means to prevent people from "crashing" their bulletin boards. Some people will program their computers to call and hang up immediately, tying up your phone line and preventing others from calling. Many others, if the chance presented itself, would not hesitate to erase your disks or otherwise incapacitate your BBS. Sysoping can be a thankless task.

On the other hand, sometimes the right combination of people make for a varied and interesting exchange of information--and when a rude caller makes trouble, the other callers will make it known that they do not approve. You can find great satisfaction in knowing that you are helping so many users disseminate useful information. And this happens as often as a Sysop gives up in disgust as callers abuse the system.

Many BBSs like to force new user "registration" before new people are allowed access. A verifiable address and phone number are required, that preventing people from getting away with leaving impolite or libelous messages. In fact, simply requiring a full name will often deter buffoonery.

So, how does a TI 99/4A owner go about setting up a BBS? First, the hardware required:

On top of your TI 99/4A console and monitor, you will need an RS232 card, disk drive, 32K memory expansion, acoustic coupler (modem), and most probably a printer. Still want to be a Sysop?

The RS232 card allows your computer to "talk" to your modem, which in turn talks to your phone line and its caller. A few models of modems are available; you will need the "smart" type. Smart modems can be instructed by the computer to hang up and answer the phone automatically. This is necessary since a Sysop cannot be expected to be present all the time a BBS is running. You will also want to consider what speed modem, meaning how quickly the modem can transfer data over the phone line, you would like. Data speed is expressed in "baud rates" and "bits per second" (actually two different terms), and the two generally accepted speeds are 300 and 1200 baud. 2400 is also becoming available, but a typical BBS can function quite well at 300 baud. Information is transmitted about as fast as a person can read it, and probably no more than half the callers will have modems that can support baud rates higher than 300 baud callers. Whichever speed you choose, your TI 99/4A will be able to adapt.

Depending on just how much information you would like our BBS to store, one or two disk drives are required, as is a memory expansion card. The 128 or 512K RAMdisk cards are excellent for BBS usage since they save wear and tear on your disk drive, but run-of-the-mill 32K cards will serve equally well. A printer is also helpful, giving a hard copy of some of the callers' activities.

After you have gathered together the necessary hardware, you will need appropriate BBS software. What BBS program you choose will have a great effect on its "aura" and usage. And some people like to write their own. In fact, many of the TI 99/4A BBSs available today were for the use of a particular Sysop, who then decided to market the program.

TIBBS by Ralph Fowler is thought by some to be the "original" BBS program for the TI 99/4A. The flagship BBS is in Atlanta, Georgia, and the number is (404) 425-5254. TIBBS retails for well over $100, so it is not the most economical BBS available. The best benefit of TIBBS is that it has been time-tested and should have very few, if any, errors in its code. The majority of TIBBS is written in TI Extended BASIC, but making additions to the program is difficult because the program takes up most of the available memory. More information on TIBBS can be reached by writing:

Ralph Fowler
P.O. Box 383
Kennesaw, GA 30144

Quite a few BBS programs are "fairware," meaning that they are freely distributed and copied. And if the Sysop finds the BBS useful, he pays a specified amount to the author for the author's programming efforts. TECHIE is an excellent fairware BBS by Monty Schmidt, and has all of the features of TIBBS, including XMODEM file transfers, which are faster than TIBBS's standard Terminal Emulator II transfers. Then again, a special XMODEM terminal emulator is required to take advantage of the XMODEM protocol transfers.

For more information on TECHIE, write:

121 North Blair
Madison, Wisconsin 53703

Scott Darling of Spokane, Washington, has made available his BBS as fairware. The number of his main BBS is (509) 484-6163. More information on his BBS can be found at:

W. 5515 Woodside
Spokane, WA 99208

Scott is also on Compuserve's TI Forum. His ID is 72366,714.

John Clulow and Ron Gries of Ohio have written the public-domain TI-COMM BBS. Information on TI-COMM can be found at:

New Horizons User Group
345 W. South Boundary Road
Perrysburg, OH 43551

TI-COMM includes instructions on building the auto-answer/auto-dial device so that a smart modem is not required.

So, a substantial investment in software is not necessary; the programs are available, or you can write your own. One rough spot is in finding out just when a user has called. And detecting their carrier (and finding out if they have hung up prematurely) must be done through an assembly language routine. Thorough knowledge of assembly is not required, however. Due to space considerations, the other programming pitfalls have to remain uncovered. But the carrier detect is the major problem.

Still want to be a Sysop? It does take dedication and hard work, but it is often satisfying and enriching for both you and your users. Housing a BBS is a true, time-consuming commitment. You will probably want to call some current BBSs to see just how the Sysop controls and adds to the flow of information. Best of luck. And welcome to the select club of TI users who are sharing for the advancement of their machines. ●

Randy's Ravings

by Randy Holcomb

This is my last monthly "Randy's Ravings" column for the TI for the *Computer Shopper*. But, this does not mean that the *Shopper* is dropping TI coverage. It is, rather, an expansion of the coverage that is so vitally needed in the computer community.

Effective with this column two new names will be seen heading the 99/4A coverage: Ron Albright and Jonathan Zittrain. You may already know these folks from the TI Forum on CompuServe, and Ron recently wrote a book called *The Orphan Chronicles* which I hope to review as soon as I get it (I will still peiodically do a TI piece every now and then as I see fit, and will cooperate with Ron and Jon to make sure that we don't duplicate or overlap material.) So in the future, if you have any questions, comments or suggestions this new column is your new resource for TI 99/4A Information. Dick Evans is doing a very nice job doing coverage for TI Professional owners and will continue on in that stream. Both Dick and myself can also be reached on the TI Information Network on Delphi, and I will still field 99/4A questions there. Dick's Username is ELLISCO, and mine is RANDYH.

For those of you who have sent me mail with SASE's that I did not return, they will be forwarded to a very energetic TI owner in California, Teresa Masters, president of the Los Angeles 99/4A Users Group, who will do her best to get this backlog ironed out and get your questions answered.

Why am I "dropping" out? I'm not really dropping out of my coverage, but I have reached a stage where my own personal needs require a new outlet, and I have found it with my (gasp) Atari 520ST. I have been talking to other individuals, and I have found that a lot of folks who previously had a computer are buying Atari's, while first-time buyers are swooning over the Amiga. Why this is happening I don't know. My own opinion is that should you decide to upgrade outside of the /4a, I think you'll find the Atari a nice choice if you aren't too hot about the rest of the world (read: MS-DOS and Apples.) Please don't take this as my effort to convert you over to a new machine - I still find the TI 99/4A superior in many ways and I have NO intentions of dumping my /4A! For many people the 99/4A will be all the computer they will ever need. However if you really need to upgrade and go beyond the capability of /4a, then you should give some serious thought to the Atari ST Series.

Right now, as you are reading this a renissance of the Home Computer is beginning and people are once again rediscovering the delights of having a home computer. The reasons are as wide and diverse as the people are who use them. It is important to remember that there are many people who own TI computers and have no idea where to look for peripherals, software, and so

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TIMEX-SINCLAIR

Timex Sinclair Survival Column

by Mark Fendrick

At long last I have a new Sinclair QL (for Quantum Leap) in front of me. In fact, this column is being written on it using the bundled word processing software. Available for a little more than a year in the United Kingdom, QLs are just now becoming readily available here in the United States. Their original appearance here, at a price of $499.00, was through American Express, but now, for $299.00, they can be ordered directly from Sinclair Research Ltd. or from many of the long time Sinclair dealers.

Unlike its ancestors, the QL is not based on a Z80 CPU. Instead Sinclair, figuring it to be a likely future industry standard, chose to use the Motorola 68008 processor. It is a high speed 32 bit processor with one megabyte of address space. The QL comes with 128K (32K dedicated to the display and 32K for the QDOS operating system and Sinclair SuperBASIC), which is externally expandable to 640K. It can be networked with up to 64 QLs or Spectrums. The QL allows multi-tasking (running more than one job at a time) and makes use of this by running a real-time clock whenever the QL is powered up. A simple BASIC command inputs the year, date and time, and the QL automatically supplies the day of the week. The computer can print this information, correct to the second, at any time until the QL is turned off. In addition, the QL's multitasking abilities allows control of the computer even while the microdrives are operating or the printer is printing.

The first thing I noticed when the box was opened was a number of 8½ by 11 inch papers which, it turned out, were an American "translation" of the *QL User's Guide* written for the British computer. It mentions the American warranty (90 days), U.S. dealers, and technical information pertaining to the display on the American QL. This is necessary because the U.S. N.T.S.C. standard is different from the British P.A.L. standard.

The *User's Guide* is an impressive looking binder with a number of sections: Introduction, Beginner's Guide, Keywords, Concepts, QL Quill, QL Abacus, QL Archive, QL Easel, and Information. This is where the first noticeable discrepancy between the British manual and the American computer is noticed. When you examine the folder that contains the bundled software, you will find programs imaginatively called Database, Spreadsheet, Word Processor, and Business Graphics. For some reason, the British names of these programs were changed to descriptions instead. To further confuse matters, the programs themselves refer to the British titles. Confusing? The word processor is in reality QL Quill, the spreadsheet is QL Abacus, the database is QL Archive, and the graphics program is QL Easel. These are integrated programs that can pass information between themselves.

The manual itself looks impressive and probably contains much information about using the computer, but it is very difficult to use at first. Many of the features are covered in more than one section, with no overall index or table of contents. In fact, only the Keywords and Concepts sections have any index. Perhaps there is a benefit to this, since you must thoroughly read the manual before you sit down to do any serious programming. However, it took me almost five minutes to find the paragraph on how to format a microdrive cartridge, and to learn how to load a program from microdrive took just as long. And many of the things I know can be done on the QL don't seem to be described in the *User's Guide*. Many of the techniques I have learned so far have come from other sources. (Stay with us here in *Computer Shopper*; I will be covering many programming topics in the months to come.) I would like to see some form of cross reference guide added to this manual. Also there is practically no technical information for those interested in that sort of thing. *The QL Technical Guide* is available separately from Sinclair.



Sinclair QL Computer

The box contains the *QL User's Guide* along with an American addendum, the computer itself, the power supply, a networking cable, and the necessary cable and switchbox to connect your QL to a television. If you want to connect your computer to either a monochrome or RGB monitor (composite color monitors are not recommended) you will need an additional cable, which most QL dealers can supply. Sinclair Research itself offers a package that contains the computer, a compatible RGB monitor, and a printer.

The computer itself is what you would expect from Sinclair. It is a compact black

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The Timex Sinclair Amateur Radio Users Group

by Alex Burr

The Timex Sinclair Amateur Radio Users Group is made up of computer users who are interested in putting their Timex or Sinclair computers to use in amateur radio operations. Most of the members are not computer experts, but they do have good technical backgrounds in electronics. So they learn quickly about their computers. Most members are licensed by the Federal Communications Commission to operate in the amateur radio service, and one of the main reasons these amateurs bought their computers was to use them in their radio-operating activities.

The journal of this group is called QZX. The name was patterned after some of the abbreviations for operating procedures used by amateurs and after some other magazines familiar to the amateur. The journal is the main benefit for the membership. It is sent monthly, by first class mail. Membership costs $12 per year (with a $13 postage surcharge for members who live outside of the United States, Canada, and Mexico). The journal publishes complete programs and hardware projects submitted by members, personal items about the members, and information about operating events, such as nets, in which the members might be interested.

Organized more than four years ago, the organization is a small but active collection of people working hard to expand the usefulness of their computers by writing programs and buying and inventing hardware additions. There are members in almost every state and in about twenty different countries.

The latest effort of the group is the organization of a computer bulletin board as part of the nationwide FIDO NETWORK. This node is designed to serve the members of the organization and others interested. Messages can be sent to network 15 node 1006 (15/1006). The bulletin board can be accessed directly at (505) 646-5194. Files available include early copies of articles to appear in QZX, the group newsletter. For more information send SASE to Alex F. Burr, K5XY, 2025 O'Donnell, Las Cruces, NM 88001. ●

Charting Your Fuel Efficiency

by T. R. Beatty

I've always kept an eye on the fuel efficiency of my vehicles. A change in the mileage rating, be it sudden or gradual, can signal the need for a major engine repair.

My interest in fuel economy prompted me to write a BASIC program that prints a matrix that makes mental calculations obsolete. Similar to distance tables found in an atlas, my miles per gallon (MPG) table gives an approximation of fuel efficiency by intersecting the miles driven (found on the top row) and gallons used (located down the left column). Although some extrapolation is necessary for distances and quantities of fuel not listed, the MPG estimates are precise enough for most drivers not needing six-decimal accuracy.

Written in Microsoft BASIC, the program (Fig. 1) will run on most computers equipped with an 80-column printer. I've used it on a Kapro and a Radio Shack Model 100. The logic relies heavily on the use of embedded FOR-NEXT loops to calculate cell values in a two-dimensional array and to print a working copy of the matrix (Fig. 2). On-screen prompts are provided to advise the user that the program is functioning properly during the delay necessary to dimension and populate the array.

The program is easily modified to meet different hardware or end-use requirements. For example, you could take advantage of a 132-column printer by increasing the column size of the array and changing the values of the indices in the FOR-NEXT loops. Or, if you need a matrix to estimate wind chill, given temperature and wind velocity, change the FOR-NEXT indices accordingly, and substitute the correct mathematical formula within the loop.

I would be interested in receiving user comments on the program--ways to improve it, other applications, etc. You may contact me through Compuserve's EasyPlex (User ID: 70235,1121), or in writing to Thomas Beatty, c/o *Computer Shopper*, P.O. Box F, Titusville, FL 32781. ●

```
100 REM     ************************************************
110 REM     *****      MILES PER GALLON CONVERSION       *****
120 REM     *****        T. BEATTY  (70235,1121)         *****
130 REM     *****                                        *****
140 REM     ************************************************
150 PRINT CHR$(26)     '      CLEARS SCREEN (TANDY USES CLS)
160 PRINT "LOADING ARRAY - - -":PRINT
170 DIM A(16,12)
180 H1$="####  "
190 H2$="##.#  "
200 PRINT "CALCULATING ROW: ";
210 FOR R=5 TO 20
220 PRINT R-4;
230 FOR C=0 TO 11
240 A(R-4,C+1)=(100+(C*15))/R
250 NEXT C
260 NEXT R
270 PRINT "  DONE"
280 PRINT:PRINT "NOW PRINTING MATRIX - - -";
290 LPRINT TAB(32);"MILES PER GALLON":LPRINT:LPRINT
300 LPRINT TAB(9);"DIRECTIONS:  (1) FIND MILES DRIVEN FROM TOP ROW."
310 LPRINT TAB(9);"             (2) FIND GALLONS FROM LEFT COLUMN."
320 LPRINT TAB(9);"             (3) INTERSECT ROW AND COLUMN FOR APPROXIMATE MPG
    ."
330 LPRINT:LPRINT
340 LPRINT "     ";
350 FOR K=100 TO 265 STEP 15
360 LPRINT USING H1$;K;
370 NEXT K
380 LPRINT:LPRINT
390 FOR R=5 TO 20
400 LPRINT USING H2$;R;
410 FOR C=1 TO 12
420 LPRINT USING H2$;A(R-4,C);
430 NEXT C
440 LPRINT:LPRINT
450 NEXT R
460 PRINT " DONE":END
```

FIG. 1

MILES PER GALLON

DIRECTIONS: (1) FIND MILES DRIVEN FROM TOP ROW.
(2) FIND GALLONS FROM LEFT COLUMN.
(3) INTERSECT ROW AND COLUMN FOR APPROXIMATE MPG.

	100	115	130	145	160	175	190	205	220	235	250	265
5.0	20.0	23.0	26.0	29.0	32.0	35.0	38.0	41.0	44.0	47.0	50.0	53.0
6.0	16.7	19.2	21.7	24.2	26.7	29.2	31.7	34.2	36.7	39.2	41.7	44.2
7.0	14.3	16.4	18.6	20.7	22.9	25.0	27.1	29.3	31.4	33.6	35.7	37.9
8.0	12.5	14.4	16.3	18.1	20.0	21.9	23.8	25.6	27.5	29.4	31.3	33.1
9.0	11.1	12.8	14.4	16.1	17.8	19.4	21.1	22.8	24.4	26.1	27.8	29.4
10.0	10.0	11.5	13.0	14.5	16.0	17.5	19.0	20.5	22.0	23.5	25.0	26.5
11.0	9.1	10.5	11.8	13.2	14.5	15.9	17.3	18.6	20.0	21.4	22.7	24.1
12.0	8.3	9.6	10.8	12.1	13.3	14.6	15.8	17.1	18.3	19.6	20.8	22.1
13.0	7.7	8.8	10.0	11.2	12.3	13.5	14.6	15.8	16.9	18.1	19.2	20.4
14.0	7.1	8.2	9.3	10.4	11.4	12.5	13.6	14.6	15.7	16.8	17.9	18.9
15.0	6.7	7.7	8.7	9.7	10.7	11.7	12.7	13.7	14.7	15.7	16.7	17.7
16.0	6.3	7.2	8.1	9.1	10.0	10.9	11.9	12.8	13.8	14.7	15.6	16.6
17.0	5.9	6.8	7.6	8.5	9.4	10.3	11.2	12.1	12.9	13.8	14.7	15.6
18.0	5.6	6.4	7.2	8.1	8.9	9.7	10.6	11.4	12.2	13.1	13.9	14.7
19.0	5.3	6.1	6.8	7.6	8.4	9.2	10.0	10.8	11.6	12.4	13.2	13.9
20.0	5.0	5.8	6.5	7.3	8.0	8.8	9.5	10.3	11.0	11.8	12.5	13.3

FIG. 2

Timex Sinclair
continued from page 61

unit, containing the microdrives built-in. The QL measures 19" x 5½" x 2". The keys on the keyboard are all at the same level, not stepped. But by using the feet supplied with the computer, your QL sits at an angle that is not difficult to get used to. I must admit that, after using the T/S 2068 for so long, it did take me some time to get used to using this keyboard. But, it is happening. The QL has many keys not found on the earlier Sinclair computers — CTRL, F1 through F5, TABULATE, and ALT, as well as separate cursor control keys. Unlike the T/S 2068 keyboard, this is not a silent keyboard. Especially the space bar does make noise. There are two sets of characters available directly from the QL keyboard, including foreign and special mathematical characters. (Right now, my major problem is hitting the CTRL key when I mean to hit the SHIFT key, this producing an alternate character.) Notice also that there are no keywords printed on the keys as with previous models. The one stroke keywords that Sinclair is known for do not exist on the QL; they must be typed in, one character at a time. For BREAK, use CTRL-SPACE, and for DELETE, use a combination of CTRL and either the left or right cursor key.

Unfortunately though, Sinclair still seems to be having difficulty designing keyboards. When I first started using my new QL, I had a problem with the bottom row of keys. When one key (such as the "M") was depressed, I would get two characters ("NM"), or some keys would give a double character ("MM"). In the case of "MM", this was caused by the keys sticking. This eventually worked itself out, but occasionally I still get a double character. From the days of the membrane keyboard on the ZX-80, Sinclair has been receiving criticism on its keyboards. In fact the ZX Spectrum had to be redesigned with a new keyboard. (The Spectrum + looks very similar to the QL.)

When Timex redesigned the ZX Spectrum to produce the T/S 2068, they added an ON/OFF switch, a move much applauded by all. Sinclair has not caught on to this yet, but they did include a RESET button, a halfway measure. To turn the QL off, however, you must either unplug the power supply or have a switchable outlet.

The power supply is a change from the earlier models in that the transformer sits on the cable halfway between the outlet and the computer. The plug is a normal three prong



QL Microdrive Cartridge

grounded type. This is an improvement over the type that has the transformer go directly into the outlet, since it does not cover the neighboring outlet.

The back of the computer has two ports for networking, the power port, an RGB port (which produces fine results on a monochrome monitor as well), the TV port along with a channel 3/4 switch, two serial (RS-232C) ports for printer, modem etc., two joystick (Atari type) ports, and a port for add-on ROM cartridges. The right side panel has a port to which you can add up to six additional microdrives or floppy disk drives. On the front right hand side are the two built-in microdrives. The left side panel contains the expansion port through which additional RAM memory can be added. Although the communications ports are both RS-232C standard, there are add-on Centronics (parallel) interfaces available, which fit either into the one of the serial ports (as my Miracle Systems interface does) or into the ROM port (as the Kempston interface does).

After this brief tour you are ready to attach your computer and start using it. Upon power-up, you see a screen with the Sinclair copyright notice and the choice of pressing F1, if you are using a monitor, or F2, if you are using a TV. This sets the display so that you can have the most compatible display. Choosing F2, for use on television receivers, sets the QL to a 40 column display. In this mode, windows 1 and 2 (the QL has three window screens which you can control) are set to the same size, so that you see a single window on a black background. Pressing F1 gives you the high resolution display. This display shows 85 characters on a line and starts out with a split screen. On the left is window 2 which is the default window to which program listings are sent. On the right is window 1, which is the default window for all program output. The low resolution mode has eight available colors (black, blue, red, magenta, green, cyan, yellow, white), which can be used to make multi-color patterns, while the high resolution mode can use four colors (black, red, green and white). In both modes window 0 is the window in which immediate commands are shown, as well as being the normal program editing screen. The QL provides full screen program editing in this window. In all cases, output can be sent to any window simply by specifying the number in a SuperBASIC command. For instance, to list a program to window 1 simply issue the command LIST #1.

The operating system writ-

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TANDY COMPUTERS

ADOS — After Market Disk BASIC For Color Computer

by Tom Garcia

Tandy's Color Computer has always had an easy-to-use disk operating system (DOS) which is there when you need it, because it is in read-only-memory (ROM). That is to say, it's on a chip inside the disk controller (that thing that plugs into the right side of the computer) and when you press in the master power switch everything is up and running in about a second. There isn't anything to load from a disk and the chip "firmware," besides being fast, is just about crash proof. Tandy has made a few minor changes to the DOS over the years but nothing drastic. However, a DOS on a chip does have a few disadvantages for those who like to experiment and "improve" on things. So, people found ways to move the DOS from the chip to the upper reaches of random access memory (RAM) where bytes could be examined and, more importantly, changed. Lots of neat things could then be done, such as: Assigning new disk drive access times (speeding things up), turning the original 35 track setup into a 40 track system, and loading new default values for things such as printer baud rates. A few knowledgeable and adventurous individuals even figured out how to "burn" completely new disk controller chips to replace Tandy's original item.

Now the good news--Anyone can have a custom Color Computer DOS thanks to SpectroSystems ADOS. The new disk basic is compatible with all the software that I have tested it with and that is more than I can say for one particular Tandy chip (version 1.1) when paired up with some of the older commercial programs. The new features provided by ADOS are so numerous that I am only going to be able to comment on a few of them here. Suffice to say, this DOS gives you plenty of latitude to customize to your hearts content.

ADOS comes on a disk and can be loaded into the upper 32K of RAM and used immediately. A dozen or so pages of documentation make everything simple. Too bad all documentation isn't done this well. After you get the hang of



68766 EPROM with ADOS

things you will no doubt want to start customizing for your own particular needs. This is accomplished via the use of two supplied programs: CUST/BAS and CUSTOMIZE/BAS. Here is where the fun begins! I had a ball changing, changing again, and then deciding to go to something else in the way of custom defaults. In fact, I spent three weeks playing with the customization routines before I settled on my final version. And, it was really "final" because I was going to have ADOS burned into an erasable programmable read only memory (EPROM) so ADOS had to be the way I was going to want it "forever." Those of you who own your own EPROM burners can, of course, erase the data in your EPROM and re-burn twice a day if you so desire, but I don't have that luxury available.

SpectroSystems provides names and addresses to five or six individuals who can make up ADOS chips for you. All you have to do is save your custom version of ADOS on tape or disk and mail it to one of the addresses given. Plan on spending about $20 for this service, which includes the price of the chip. Several of these people will re-burn at a reduced rate, $5 to $10, if you later decide to re-configure your DOS. I bought a 68766 EPROM locally ($19.95) and had a friend in the local user group program it for me.

Now, on to the new features that I like best. First on my list is the new sign-on logo that comes up on the top two lines of the screen with power-on. No big deal you say? Well, I have been looking at Tandy's sign-on for better than four years and I'm tired of it. So now I have my favorite slogan instead. I'm a Navy football fan and sign-on brings BEAT ARMY! I also get to see my name and telephone number, which might help me get my computer back if it's ever stolen.

ADOS makes the down arrow key a control key and other keys, in conjunction with the control key, can be programmed to perform little subroutines. This feature is what kept me playing with ADOS for three weeks, I just couldn't decide what tickled my fancy the most as far as custom programmed/keys went. A number of possibilities (actually, 22) are provided on the original ADOS program disk, such as CONTROL-R FOR "RUN" and CONTROL-G for "GOTO." Any key can be configured or re-configured to your preference. The first thing that I wanted, due to the kind of things that I do with my computer, was a single key command for POKE 113,0: EXEC 40999 which is the cold start routine. Now I have it with CONTROL-X. Remember, once an EPROM is burned you can no longer change features such as control key assignments (without erasing and reburning) so try and get it right the first time.

The DIR command has been modified so that the number of free granules is printed at the end and a way has been found to allow two extra lines of directory entries to be displayed on one screen. If even more directory information is desired a new command, CAT, has been provided. This works some-

continued on page 64

Tandy Topics

by Lon Andrews

Whereis

Personal Computer Products' WHEREIS program will locate your files on floppy or hard disk and list the pathname to the directory, the filename, time and date of creation and the size of the file. This didn't seem like a tremendous asset to me at first. You have to remember that I still think in terms of TRSDOS 6 where the DOS will do a sequential search of all the drives for a filename. MSDOS is still fairly new to me and I am still learning. Don't ask which DOS I prefer because I am still prejudiced in favor of the old faithful 8 bit DOSs but I am slowly weakening. It made sense to me to divide the hard drive into four logical drives which could be accessed sequentially in search of a file.

Not so with MS-DOS. The hard drive is set up as one drive and then subdivided by using sub directories. Enter WHEREIS. By using one of several commands the drives will be searched for a particular file or type of file. When it is found the results will be displayed on the CRT or printer as you desire.

Using the program is easy. It is supplied on a data disk and can be copied to any location you desire. Install it in the root directory and you are in business. The commands are as follows: A>WHEREIS (drive:filename.ext) finds filename.ext on specified drive. (*) may be used where the file name or extension are unknown. WHEREIS *.* finds all files. WHEREIS *.DOC finds all files with the extension DOC. (?) may be used where one character is unknown.

That is all there is to it. The program works like a charm. The documentation is on the disk in a .DOC file. There are 4 pages that will help you through setting and getting started. I like the docs on the disk as it keeps the price down. More and more programs are appearing that carry the docs on the disks.

If you are building a file library on a hard disk WHEREIS will be a most welcome addition to your system. It also works on floppies if you desire. For the price you can't go wrong with WHEREIS!

WHEREIS for MSDOS
$29.95
Personal Computer Products
3080 Olcott Drive
Suite 130B
Santa Clara, California 95051
(408) 998-0164

Hard Drive Won't Format?

You order a new internal hard drive for the Tandy 1000 at a good price and wait anxiously for delivery. It finally arrives and, after reading the documentation, off comes the cover and in goes the hard drive. It isn't hard to install at all. Three screws to hold the drive in place (one of these can be a real bear to get started) and obviously, according to Murphy's Law, the screws are a different size than the ones used to mount a floppy drive.

continued on page 64

Newest Tandy Grant Winners Announced

Six educators and educational institutions have been awarded grants by the Tandy Educational Grants Program. The Tustin (California) Unified School District won its second grant within an 18-month period. Since 1982, more than $1 million in computer hardware and software has been donated by Tandy under the grants program.

The winners were picked for submitting the best proposals for applications of microcomputers in the social sciences, with emphasis on simulations.

The projects and the winners are:

Marjorie Jannotta of Albuquerque, New Mexico, who will evaluate the effectiveness of simulation training while documenting the use of small computers as a field data collection tool in structured observation and survey research.

Thomas Wilson of Rosemount High School in Rosemount, Minnesota, will actively involve social studies students in instruction in the use of learning skills such as referencing and organizing information. Thinking skills in comparing, analyzing and hypotehsizing will also be developed.

Lynn Parisi of the Social Science Education Consortium in Boulder, Colorado, will encourage greater and more effective use of computer-assisted instruction in the social sciences through faculty workshops. These will focus on higher level applications.

Marcus Ethridge of the University of Wisconsin, Milwaukee, plans to educate students in the logic of simulations. Working within the context of political science and public administration, Ethridge will concentrate on the problems of sensitivity analysis, discounting, forecasting and coalition behavior.

Dr. Thomas Goodkind, Department of Curriculum,, University of Connecticut, will demonstrate how teacher-created Author 1 software — featuring simulations — can teach substantive social studies content and develop students' critical thinking skills.

William Watts of Tustin Unified School District will get students to demonstrate their ability to analyze, research and understand theories. They will then transfer the results of the scientific inquiries to other academic areas.

Tustin won an earlier Tandy Grant in fall 1985 for special education projects. ●

Tandy Topics continued from page 63

```
2 (Alphabetic list of all help files)

 1> ARISTO      2> ASCII       3> ASSIGN      4> ATTRIB      5> AUTOEXEC
 6> BACKUP      7> BATCH       8> BREAK       9> BUFFERS    10> CD
11> CHDIR      12> CHKDSK     13> CLS         14> COMMANDS  15> COMP
16> CONFIG     17> CONTENT    18> COPY        19> COUNTRY   20> CTTY
21> DATE       22> DEBUG      23> DEL         24> DEVICE    25> DEVICES
26> DIR        27> DISKCOMP   28> DISKCOPY    29> ECHO      30> EDLIN
31> ERASE      32> EXE2BIN    33> FCBS        34> FDISK     35> FILES
36> FILTERS    37> FIND       38> FOR         39> FORMAT    40> GLOBALS
41> GLOSSARY   42> GOTO       43> GRAPHICS    44> GRAFTABL  45> HELP
46> IF         47> INDEX      48> INTRO       49> JOIN      50> KEYB
51> KEYS       52> LABEL      53> LASTDRIV    54> LINK      55> MD
56> MKDIR      57> MODE       58> MORE        59> OWN       60> PATH
61> PAUSE      62> PIPING     63> PRINT       64> PROMPT    65> RD
66> RECOVER    67> REDIRECT   68> REM         69> RENAME    70> RESTORE
71> RMDIR      72> SELECT     73> SET         74> SHARE     75> SHELL
76> SHIFT      77> SORT       78> SUBST       79> SYNTAX    80> SYS
81> TIME       82> TREE       83> TREE-DIR    84> TYPE      85> TYPES
86> VER        87> VERIFY     88> VERSIONS    89> VOL       90> -A
91> -C         92> -D         93> -E          94> -F        95> -G
96> -H         97> -I         98> -L          99> -M       100> -N
101> -O       102> -Q        103> -R         104> -S       105> -T
106> -U       107> -W
```

TREE DIR

```
            - TREE DIRECTORY -
This file explains the concept of tree directory, related terminology and
usage.

The term "tree" directory refers to the method in which DOS (and some other
operating systems) organizes files on the disks.

Note that the support of a tree directory is the key difference between DOS
2.0 & the preceding versions (Which are not addressed by DOS-Helper).

The following example figure will be used in most of the subsequent
discussion.

                  ----------------------------
                 / root directory of drive b \
                 \____________________________/
                              :
     ------------------------:-----------------------------------
 ____:___          ____:_____          ___:_________       _____:____
| NOTES  |        / ACCNTING \        | COMMAND.COM |     / PROJECT1 \
|________|        \___________/        |_____________|     \__________/
                       :                                        :
     ------------------:--------------------                 ____:___
 ____:___     ___:_____    ___:____   ___:____          __:__     __:__
| MEMO.DOC |  / PAYABLE \  / RCVBLE \ / LEDGER \        / TOM \   / JIM \
|__________|  \__________/  \________/ \________/       \_____/   \_____/
                    :           :          :              :         :
               _____:_____
          ___:_____   _____:_____
         | ABC.CO |  | GASTON.CO |
         |________|  |___________|
```

```
Example Screens: Each screen is displayed in response to the underlined
command above it

                              INTRO

;---------------------- MAIN FEATURES MENU ----------------------;
:                                                                :
:  PARAMETER      HELP                                           :
:  -----------    ---------------------------------------------  :
:  INTRO.........Introduction.                                   :
:  CONTENT.......Logically ordered list of the help topics.      :
:  INDEX.........Alphabetic list of the help topics.             :
:  COMMANDS......Lists of the DOS commands + brief explanation.  :
:  command_name..Help for the given DOS command.                 :
:  topic_name....Help for the given topic.                       :
:  SYNTAX........Definitions of DOS related syntax conventions.  :
:  OWN...........How to create your own help files.              :
:  ?.............Select one.                                     :
----------------------------------------------------------------

The above menu summarizes the key features of the help system.  Additional
help is provided below...

* BASIC CONVENTIONS:

- UPPER CASE words should be typed AS IS.

- Lower case words should be replaced by the necessary data.

- CTRL/x means: "Hold the <CTRL> key down, and while it is down press the
  x key".
```

Insert the controller card (be careful that you don't drop the screw), hook up the ribbon cables to the drive, plug in the power leads and you are ready. Just a few points to watch. Be sure that the flat ribbon cables do not hit the fan. You won't believe how hot the 1000 will get running a hard drive without the fan. Best to take the time to route the cables under the shielding and then up to the drive. I cut mine to fit to eliminate the slack.

With the cover in place you are ready to format the hard drive. I used the software that came with the drive and the fun began. The hard format was fine but then the process stalled at the last step of the FDISK. After repeated attempts I got as far as the last format command that transfers the DOS to the hard disk. At this point I kept getting Not Sufficient Memory To Transfer System. Since I have 640K I was sure that something was amiss.

There I was. A new 20 meg internal hard drive from Software Support in my new Tandy 1000 and I couldn't get the computer to talk to the drive.

Frantic phone calls followed. Nothing local helped. A call to the supplier was met with a polite "return the unit and we will see what is wrong." Finally they decided it was the DMA that was the culprit.

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ADOS
continued from page 63

thing like the MS-DOS command DIR/W, slightly modified to take CoCo's narrower screen size into consideration. CAT produces a two-column listing of disk files.

Now you can set up for the use of 40 track drives and you can even use double sided drives so that one drive does the work of two. It's all explained in the ADOS manual.

The list of features goes on and on: Automatic line numbering for the writing of basic programs, error trapping (equivalent of ON ERROR GOTO), COPY and RENAME enhancements, ability to route text output to the printer as well as the screen, basic commands in upper or lower case, and more. Several utilities are provided with the package, including a high resolution text screen driver, a program to convert 35 track disks to 40 track disks, a directory utility (BOOT/BAS) that goes far beyond the DIR and CAT capabilities, and even a mini-monitor that gives you hexadecimal memory examine and change capability.

As I mentioned before, almost any software that you might have will be compatible with ADOS. On the odd chance that you should run into something that isn't going to get along with ADOS it is a simple matter (a minute or two) to pop your disk controller cartridge apart and swap the ADOS EPROM for your original Tandy controller chip although I doubt that you will ever have to do that. A very few programs, such as a word processing program that I use, will require a small modification, that being--The inclusion of a line of code in the basic loader that includes the DISABLE command. This statement nullifies ADOS enhancements when invoked.

The product is one that you will be well satisfied with and the price is commensurate with the value and features that it provides. I highly recommend that you consider upgrading to ADOS Color Computing.

ADOS Enhanced Disk Basic for the Tandy Color Computer from SpectroSystems, 11111 N. Kendall Drive, Suite A108, Miami, FL 33176. $27.95 plus $2 shipping. ●

Z-NIX

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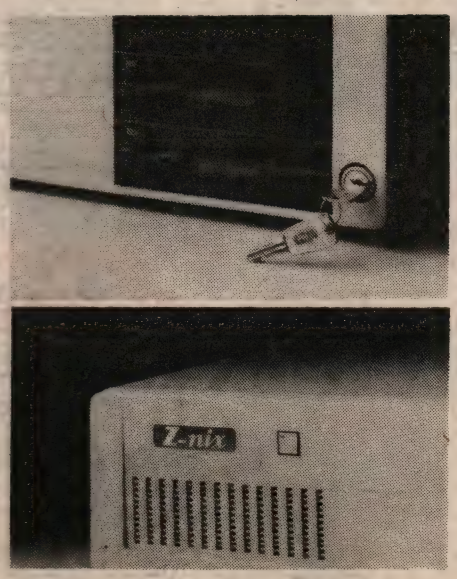
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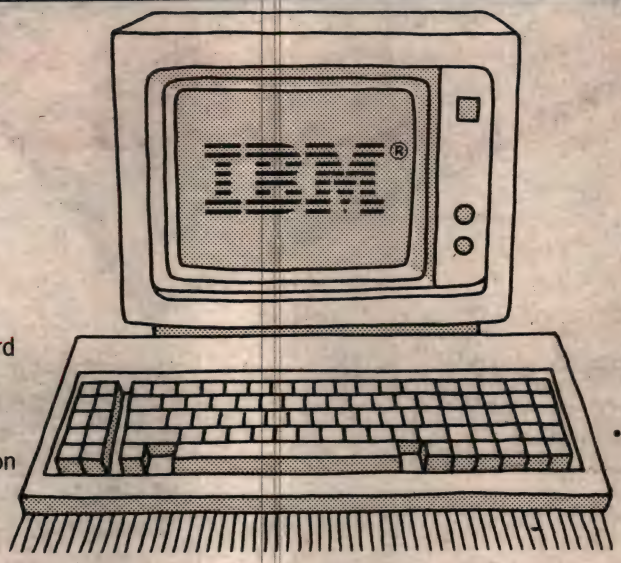
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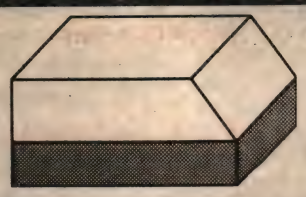
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Spotlight On Business

The Real Estate Industry
A Huge And Segmented Vertical Market

by Barbara E. & John F. McMullen

Barbara E. and John F. McMullen are regular contributers to The Computer Shopper and other leading computer publications. Additionally, they are principals of the consulting firm McMullen & McMullen, Inc. located in Jefferson Valley, New York.

No Abundance of Information

Those who have already gone off to the local computer store in search of real estate or property management software have probably already experienced the confusion of products and lack of information which one finds in trips of this nature. Those who then went to the computer section of the local book or magazine store have also probably experienced the stone wall syndrome (feeling as though you are against an immovable barrier with nowhere to go an no one to turn to).

It is difficult to readily obtain general information on the computerization of the real estate industry. There is certainly far less emphasis in popular computer industry publications on the real estate industry than there is on other financial sections of the economy such as the securities and commodity industry or on other professions such as medicine, law and accounting. Yet the real estate industry contributed $273,289 million to our national income in 1983. This number becomes more significant when compared to banking which contributed $44,710 million and insurance carriers which contributed $30,092 million. The rest of the world contributed $48,297 million to our national income in 1983 where the total for all industries was $2,651,942 million. (Source: The World Almanac and Book of Facts: 1986, published by The Philadelphia Inquirer).

Even with an apparent dearth of information, the Urban Land Institute (1090 Vermont Ave., NW, Washington, DC, 20005) reports that Builder magazine found that, in 1984, 83 percent of the homebuilders who construct over 100 units per year use computers while 58 percent of the builders who construct 26 to 100 units per year use them. Also reported by the Institute was that Building Design and Construction magazine found that 78.8 percent of engineers and 51.5 percent of architects owned computers in 1984 as opposed to 40.1 percent and 18.2 percent respectively in 1981.

An Industry Too Diverse for Simple Solutions

The diversity which is inherent in the real estate industry is certainly at the root of the general information famine. Although the total industry statistics are overwhelming in terms of numbers of dollars and people involved, the degree of segmentation of the industry is staggering. Think of the people involved:

- -There are individuals and families at every level of the economic ladder involved as both purchasers and sellers who may require computerized help.
- -There are brokers who service their needs.
- -There are firms of all sizes, complexity and type investing much like the individual.
- -There are savings and loan associations whose businesses revolve around this industry.
- -There are real estate management firms of many types who in a great variety of ways manage leased space of every sort.
- -There are brokers, appraisers, economic consultants, asset managers, attorneys, developers, financiers, syndicators, architects, engineers and construction firms who work with all of these folks.

Any of those mentioned above who are not using computers to support their activities are probably having more difficulties than they should.

- -The small residential broker may be missing deals because the entries in the Multiple Listings Service book aren't up to date.
- -The firms investing in real estate may lose out on attractive opportunities because their acquisition analysis isn't quick enough.
- -Real estate management firms may be spending too much time in bookkeeping tasks and month-end closings.

A Horizontal Solution to a Vertical Problem

How is it then that the use of computers in real estate has become so commonplace? We are not trying to be provocative by stating that the reason may be that many of the present users probably did not really need real estate or property management software for their real estate activities. All too often potential users will seek out industry-specific applications software to perform tasks which are as easily and probably less expensively handled with standard off-the-shelf applications software.

When a potential user goes into a computer store and asks for a real estate package to help keep track of properties, the salesperson most probably will try to sell products which nowhere use words such as origination fees, mortgage, amortization, tax shelter. The salesperson may also assure the potential buyer that the products being recommended will do the job. It would

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Horizontal Software Does The Job For Susan Newman, Vice President and Controller of a New York City Real Estate Management Firm

Susan Newman, Vice President and Controller of SKS Associates in New York City, is a prime example of the fearless explorer who plunged right in to the computer revolution. SKS is a $100 million plus real estate firm who manages from 12 to 15 properties with 600 tenants in addition to 300 residential tenants. One day a few years ago, Susan was presented with a new tool. The President of the firm purchased an Apple II computer, put it on her desk and said,"Use it!". After watching it accumulate dust for a while, she said,"What the heck"and turned it on. She was hooked from then on.

Susan started working with VisiCalc. Her primary emphasis is on computerizing the accounting function. She found that she was able to very rapidly gain a lot of control with VisiCalc alone."I also looked at a variety of accounting packages", Susan said. "My biggest need was to have both individual balance sheets for each property, each of which can be likened to a little company, in addition to a consolidated balance sheet." The first problem she encountered at that time was that the maximum balances provided for in the packages were $99,999,999. This was really an Apple hardware restriction although this fact probably never appeared in any of the documentation she looked at. "The accounting products available at the micro level were a big disappointment", Susan recalled. "It did not make any difference whether it was a general purpose or industry specific package. None would do."

She continued to keep her eye on the market, looking at a industry specific packages as they came across her desk. Susan explained "Those which performed the functions I required were very expensive. Most were lacking something. The basis of accounting, cash or accrual, was wrong or there weren't the proper interfaces or it didn't handle depreciation or produce the schedules I needed. I would still have to do a lot of stuff manually. They also would require modification for my specific needs and I would be dependent on the vendor for these changes. I was not comfortable entering into this kind of arrangement".

Susan did more and more with VisiCalc, building a library of templates to assist her record keeping activities. She was ready when Lotus 1-2-3 came to market. She would do bigger and better things now. "Managing the cash is the important thing," says Susan. "We need current information and that is what we get from our models. ADP, for instance offers general ledger accounting in a service bureau environment for real estate firms but you don't see the reports for 45 days to 2 months. That is totally unacceptable in our business." Susan purchased Compaq computers and 1-2-3. Being "computer savvy"she knew that if her staff were to overcome the apprehension of using this new tool, that some training would be needed. In fact, it wouldn't hurt if she, herself, took a 1-2-3 course. It would help her to become fluent in the new product much faster. Susan signed everyone up for courses at The New School for Social Research in New York. They would start with Lotus 1-2-3.

The increased power and potential that was realized with the conversion of her office to the new hardware/software configuration stimulated her thinking. The accounting nightmare kept threatening to get out of hand. Susan knew from what she saw of computer power that there was a solution for her. She finally picked a database management system, Paradox, by ANSA Corporation, as the basis for a system she would develop to perform the accounting work. Paradox is a powerful general purpose relational database management system with built-in programming tools. It is comparatively easy to learn and use. (A review of Paradox appeared in the February 1986 issue of Computer Shopper (Ansa Paradox: The New Standard by John F. McMullen)).

Once again, Susan signed up for a course at the New School, this time to learn Paradox. She has started laying out her needs and determining the contents of her master files. She's even enjoying the task.

Although generalized, these off-the-shelf packages like Paradox do differ in emphasis, ease of use, ability to work together, capacities and hardware needs. Since the selection of any will require a significant economic investment as well as a major commitment in time to learn the product and to implement it so that it performs the work expected of it, it is important to spend the time up front to find the product which is most appropriate.

This task is more difficult for some people than others. Few will be as adaptable as Susan Newman has been. There is often an intimidation factor to deal with. The lingo associated with computers makes the topic difficult to understand, almost mysterious. There are also the mechanics of the hardware to deal with such as a typewriter-like keyboard, lots of plugs with strange names and printers which have to be fed paper and have lights and buttons on them to interpret.

Real Estate
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also not be uncommon for the potential buyer to leave the store with serious doubts especially after overhearing another salesperson trying to sell the same product to the local pet store owner.

We are not about to say that the salesperson knew anything about the real estate industry. In fact, most computer store salespersons would not be able to direct anyone to those products which do use the jargon associated with the daily activities of a realtor. However, the salesperson may have been selling the correct product. This is because there are a large group of generalized types of activities that all or most businesses engage in. There are even more software packages which support these activities. For instance, suppose budgets or sales projections are the primary task to be computerized. A real estate package is not necessarily needed to do this work. Any of the popular spreadsheet programs such as Lotus 1-2-3, Framework, SuperCalc, Enable or Multiplan may be suitable.

If files and lists of properties for sale or sold must be kept track of, then perhaps a file manager such as PFS-file or a database management system such as dBase III, RBase 5000 or Paradox will be appropriate. If it is an accounting system, a general ledger, for instance, which is needed, then one of the widely used generalized accounting system modules such as RealWorld, Peachtree, BPI or Open Systems might fit the bill.

The automation problem may be more easily solved than thought possible and a generalized off-the-shelf software product and a little education may be all that is really needed. Horizontal software, which is not aimed at a discreet market (as is vertical software), is often the proper solution. (The Feature on Susan Newman shows how horizontal software does the job for a New York city real estate management firm.)

Insufficient Knowledge Could Mean Unrealistic Expectations and Failure

The worst enemy of any computer installation is unrealistic expectations. When people finish the computer store route, they usually have any overblown expectations of writing a check, carrying a designer box back to the office, pulling it out of the carton, plugging it in and having it start working dashed to the ground and are either ready to tackle the realities of the situation or have given up the idea of having a computer system.

The decisions involving computers are basically business decisions. The prospective purchaser must understand the work to be automated and the benefits of such automation. People who try to computerize when they don't understand the work flow inevitably run into problems. It is necessary to understand a business' manual systems before hoping to choose the right software and computer system.

The amount of hard work and planning required to install the computer system also can not be underestimated. It will take time and money. A good rule of thumb is to expect the system to pay for itself either through reduced expenses or increased revenues in 18 to 24 months. It is important to a successful endeavor that a rational cost-justification analysis be performed. The cost of the computer equipment is but one element (and often not the largest) of the total investment. There will be software costs, internal costs relating to training, testing and parallel processing (running both manual and automated systems together until all the kinks are worked out). Who will operate it? Who receives reports? What happens if the system goes down? How can you prevent losing, through physical failure or error, the information that the computer maintains for you? Will you need temporary help to get all the basic data into the computer or to ease the pain of the parallel processing period? Where will the computer physically be? Is it a clean, static electricity free space accessible to all who need to use it? Will the right people use it if it is not on their desks? The questions are innumerable.

When You Are Ready to Buy, Where Do You Start?

With feet firmly planted on the ground, the selection process can start. First comes the software. Once a combination of software products are found, the rest of the purchasing is relatively easy. The software will probably operate on a particular type of equipment such as IBM PC's and compatibles or a Macintosh, for instance, and this leaves only to decide which brand is most appealing and what peripherals such as printers, printer buffers, modems are needed.

Visit several stores in different areas, both downtown and suburban. Some specialize only in decision support systems for large corporations; others look more favorably on the small business. Each will have its own combination of software products, usually one or two of each type of general purpose products. The salesman may be able to demonstrate one of each type and give some general feel for their complexity.

We asked Jim Crimaldi, Vice President of Future Information Systems in downtown New York, what they would sell to someone who comes in and asks for a real estate package. Jim said quite frankly,"We would tell him that we don't have a package for him. We would also tell him that the reason we don't carry a package for him is because we feel that they are generally too expensive for most realtors. When you put together a package for a real estate agent, the price will be in the $15,000 range."This is too high a price, in our experience." Jim told us, "A contact of mine is selling a video disk product to show pictures of properties on the multiple listings service and it costs anywhere from $3000 to $6000. This is very expensive. What we will do is to select a standard off-the-shelf database product. This is usually a more acceptable solution to the customer."

If things are still too befuddling, perhaps a consultant is needed. A course may be appropriate. The local colleges and universities, trade organizations such as the National Savings and Loan League and other industry supported groups offer or sponsor seminars and courses on the uses and selection of microcomputers and software packages. How to use specific off-the-shelf products such as Lotus 1-2-3 are also taught. Magazines such as this one and books will give you direction if it is generalized software that is being sought.

Now You Have It, What Do You Do With It?

Even with off-the-shelf software and confidence that you have selected the correct route, you may need or desire help. For instance, if the "standard off-the-shelf database product" that the computer store sold is a product like dBase III, then understand that computer programming skills are needed to use it. If Lotus 1-2-3 is selected and, after taking a class in its use, the thought of sitting down and actually building complex models is overwhelming, then a consultant to do the actual labor may be the answer. In either case, consultants charge for their time much like attorneys and accountants. It is not unreasonable that consulting fees far exceed the cost of the actual computer system purchased.

Horizontal Software Will Do Some of the Work, But What If A Specific Real Estate Package is Needed To Really Reap Significant Benefits: How do you find it and What are the Pitfalls?

Let's assume that the work to be done is unique to the real estate industry and an automated approach is desired. This is in some ways a more difficult problem than the former where an off-the-shelf package will do the job. With the former, if a popular, heavy selling product is selected to do general tasks, failure usually only occurs if individuals are unable to orient themselves to computer work.

With industry specific software, usually the hardware/software selection work is easy and usually already decided when the package is selected. However, – industry specific"can mean that someone who participates some way in an industry has a computer program which automates a very specific task that this person is involved in. Others performing a similar task may purchase the program. The way the task is performed by one person may be slightly different from the way another might do it and the program may not be suitable at all.

For example, Morris M. Pyle states in his article "Loan Amortization with dBase III" (Data Based Advisor, May 1985) that "After seeing all kinds of incomplete loan amortization programs for spreadsheets featured in various magazines, and after seeing magazine ads for high-priced stand-alone amortization programs, I chose to write this one in dBase III." Mr. Pyle ends the article by saying, "The program does not figure monthly payments as such, but almost everyone has a calculator that does that!" Well, maybe you don't!

The novice computer user does not always know the types of questions to ask or the information to look for in documentation which will help sort out one program from another. Once a whole package is purchased, the error could be mammoth. Unfortunately, this problem is far too prevalent. An amateur programmer with a computer he likes will get together with his neighbor who sells real estate and write a package of dubious quality and worth to anyone else but them and mass market it.

Vertical Software: How Do You Find It?

Vertical software, or programs aimed at specific markets such as real estate, is a rapidly growing area. Computer market analysts foresee a day when a person could go to a computer store, ask for an accounting package for his real estate business and rather than being served up the same generalized package that was offered to the pet store owner, be presented with Accounting Package #12: for Real Estate and Property Managers.

The search for quality software for a specific need may surprise the potential buyer as far as cost is concerned. General purpose quality software is expensive, but nowhere near what there is in the way of prices for vertical products. These products are not normally found in computer stores, especially franchise operations such as ComputerLand. To properly sell a vertical market product, a salesperson is needed who understands the market. Computer stores cannot afford to have the large variety of experts on staff for this kind of support and sales so it will be elsewhere that these products will be found. Direct mail, telemarketing or perhaps a visit from an outside salesperson are popular vertical market marketing tacts.

A few books are available to help a potential buyer of real estate software get started. Paul Garrison has written a book entitled "How to Select and Use Computers in Real Estate", (East Palace Publishing Company, P.O. Box 415, Department 201, Santa Fe. NM 87501, 1982.) From the Institute of Real Estate Management comes"The Real Estate Executive's Guide to Selecting and Implementing a Small Business Computer"(Institute of Real Estate Management, 430 North Michigan Avenue, Chicago, IL 60611, 1984, 144 pp.).

Touche Ross & Company has prepared a four-volume series entitled Real Estate Software Guidelines (Institute of Real Estate Management, 430 North Michigan Avenue, Chicago, IL 60611, 1984, 144 pp.) intended to help potential users determine their software requirements and the most cost-effective real estate packages. The volumes in the series are: Brokerage Sales and General Accounting, Investment Analysis, Property Management and Word Processing and List Management.

A newsletter called"Real Estate Computer Review"is available (Box 1115, San Rafael, California, 94915)

Once an approach to the problem is determined, the potential user is ready to tackle the software guides. For instance, "Guide to Real Estate and Mortgage Banking Software"(Real Estate Solutions, Inc., 2609 Klingle Road, N.W., Washington, DC 20008, 1985, 1050 pp.) is a two-volume guide containing over 425 detailed two-page analysis of software packages and other

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HEATH—ZENITH

Expanding The Heath/Zenith 150 Series

by Ted Drude

This month, we are going to take the time and space to answer some of our reader's mail that's been piling up. There are a lot of good questions and advice that have come to use from out readers. I think it's valuable that we share some of it. I'll also be mentioning some new software products and there's more info on the CPD "Time Works" speed-up module for the H/Z-150.

Adding a Drive to the "Third Slot" of the H/Z-150/158

A couple of months ago, I commented that it was possible to put three half-height drives in a Z-150 or 158. The next month, I retracted that statement and said, after really looking close at the mounting hardware, it looked like a too tight a fit for anything more than 2 drives (either two half-height or one half-height and one full height).

Well it seems, with a little work, you *can* put a standard 5.25 half-height drive in the "third slot" below the second floppy drive of an H/Z-150 or 158. Two of our readers have written and told me they are tunning Z-150s with half-height Winchesters and two floppies.

Ted Robingson writes:

"I have a Zenith Z-150 computer with a ten megabyte 1/2 height hard drive mounted under two 1/2 high floppy drives. I bought the computer with an 1/2 height floppy and a standard height, hard drive. I took out the full-high HD and put in the other setup in it's place. The HD I put in is a standard size (half-height) 5 1/4" drive. I got cables and ran them outside to the full-high HD, from the (internal) power supply and controller card. This setup works fine (two hard drives, two floppy drives, 704K or RAM...(running) a 512K RAM disk).

Ted Robinson
Bremerton, WA

Sounds like Ted has a pretty well-expanded system to me! It's nice to know that the 168 watt PS in the 150 that can handle all four drives and all that RAM. (Wonder what he does with all that storage capacity ???)

For those of us who are wondering a little more about the details of how this is done, Robert Maskasky describes how he installed a half-height Winchester in his dual floppy Z-150:

....I installed a standard Seagate ST-225, (20 Meg. 1/2 HT. Winchester) in the third slot in my dual floppy Z-150. The modifications necessary were:

1. File the plastic floppy drive holding clips for the lower drive, to make slightly more space for the Winchester.
2. Drill the third slot mounting holes to a slightly larger diameter to allow for misalignment of the Winchester mounting holes.
3. Install some vinyl grommets in the third-slot mounting holes (Radio Shack P/N 64-3025).
4. Splice a third power plug into the power supply cord (going to one of the floppy drives). Radio Shack P/N 274-234 works with a little filing on the edges of the plastic connector. Or, tee power-cord adapters are available from some mail order companies.

It's a tight fit, but it works! Installation is made easier by removal of the front panel of the computer.

Robert Maskasky
Green Cove Springs, FL

Thanks, Robert, for all the good info! Robert also pointed out that, because the Z-150 autoboots up so quickly, some hard disk controllers aren't able to handle it. He said that his OMTI controller autoboots fine and recommends it. (I'd like to add that for tapping into the disk power lines for the third drive power connector, you might look at Radio Shack P/N 64-3052, which are "tap-in" sqeeze connectors for 14 to 18 ga. wire. They may simplify the splicing process.)

Undocumented H/Z-150/158 Video Commands

Robert Maskasky also wrote:

"Some Z-150/Z-158 computers have interesting undocumented video capabilities which can be invoked with the key combinations:

CTL-ALT I 50 LINE TEXT (INTERLACED) works with DOS or a custom modified version of Wordstar.

CTL-ALT-F 25 LINE TEXT (INTERLACED)

CTL-ALT-N 25 LINE TEXT (NORMAL)

CTL-ALT-1 TEXT VIDEO PAGE 1 (Z-158 ONLY)

CTL-ALT-2 TEXT VIDEO PAGE 2 (Z-158 ONLY)

CTL-ALT-3 TEXT VIDEO PAGE 3 (Z-158 ONLY)

CTL-ALT-4 TEXT VIDEO PAGE 4 (Z-158 ONLY)

"Experiment for yourself.

I tried the keystroke sequence Robert mentioned, and they all worked on my Z-150. The "Z-158 only" ones, of course, didn't. But all the rest did. The effects they produced were quite interesting! In the interlace mode, the picture "wiggles" up and down, which is to be expected. With the proper monitor, the interlace allows for a higher resolution screen. Also, the 50 line mode does increase greatly the amount of information that you can display on the screen. Now, if we can just get the wiggle out on my ZVM-123A (can't have everything, I guess)!

CP/M Emulators: An Update For ICU's "CP/EM"

One of the CP/M Emulator programs that I reviewed in February, has just been updated: "CP/EM" from the ICU Group. In my review, I mentioned that the version of "CP/EM" I tested (v. 1.14) had suffered from intermittent crashes in the Z-80 software emulation mode. The latest version of "CP/EM" (v. 1.24), just received, seems to have solved some of the problems.

The ICU group has been working away, and it appears that a lot of the little bugs have been cleaned up. They also sent a draft version of their new manual. It describes the new features of "CP/EM" and looks like an improvement over their previous manual.

Of all the programs I reviewed, "CP/EM" is the only one that included both Z-80 software emulatin and V-20 hardware 8080 emulation in the same package. I would have probably recommended it more strongly, but the bugs kept me from it. This latest effort seems to indicate that they are trying to improve their product and are seriously interested in serving their users.

Other CP/M emulator producers have hinted at similar "hybrid" Z-80 software and 8080 hardware emulation (including Joan Riff's PD program mentioned below). right now, only the ICU product is able to deliver it. I think you may find the dual processor capability of "CP/EM" very useful if you are into running a lot of 8-bit software, and I recommend that you contact ICU for more information, if you are interested.

Joan Riff's "Z80MU" Program: CP/M For *Really* Cheap (like free!)

I ran across a very interesting program on a local PC BBS after I had written the CP/M emulator program reviews for the February article. It is a (real) Public Domain version of a Z-80 CP/M 2.2 emulator for the 8088. It's almost as good as some of the commercial programs I reviewed here a couple of months ago. The documentation provided with the program is excellent. This could easily have been a commercial program, but author, Joan Riff, decided to contribute it to the Public Domain instead. Joan has done us all a big service by providing this CP/M software emulator.

In the program documentation, Joan says that a "V-20" version of the program is forthcoming sometime in the future. When that happens, the "cheap and fast" CP/M emulation I described will be even cheaper...just the price of a "V" chip! Look for this program on your local BBS soon.

For those of you who don't have access to a BBS (or just don't want to go through the hassle of waiting for this one), I will be glad to make copies of this program on disk for you. Make checks *payable to me*, for $5.00, and send them to the address below. I'll get a disk back to you as quick as possible, postpaid, with Joan's program on it:

Ted Drude
c/o *The Computer Shopper*
407 S. Washington Ave.
Titusville, FL 32781
Attn: Zenith Disk Offer

"V" Chips Problems: They're Too Fast! (for software timers)

Some readers have experienced some problems after replacing their 8088 with a NEC "V-20" chip. Some game programs do not run correctly on the "V" chip. Paul Abraham had the unfortunate experience of finding out that an old floppy disk-booted Maynard hard disk driver program (pre MS-DOS 2.0 style), wouldn't run on the "V." When he tried to boot the disk, the program went berserk and erased part of his hard disk!

Several people have asked about buying the NEC V20 and V30 chips. You can get them from the New York Repair Depot Inc., 50 West 23rd Street, New York, NY 10010; (212) 741-3800. The V20 is $19.95 and V30 is $24.95.

Critical Software Loops: Sign of a Poor Program

These problems are really the fault of *improperly written software*, rather than any incompatibility between the V-20 and the 8088. The offending programs are relying on a specific clock speed (4.77 Mhz) and CPU instruction execution time (8088) for the critical timing of a software loop for some part of the program. When the CPU is running faster, the software loops are no longer reliable timing devices. The programs that won't run on a "V" chip running at 4.77 Mhz, probably wouldn't run on a "V" chip running at 4.77 Mhz, probably wouldn't run on an 8088 chip at a higher clock speed, either.

This software timing loop problem is particularly with on the "V" chips, because they have been optimized *especially* to run software loops faster. Because of their increased performance, the "V" chips run at a higher *effective speed,* even though the clock frequency may remain the same. A V-20 chip, running at 4.77 Mhz, for example, is really the equivalent of an 8088 running at 5.02 Mhz or a 15% increase. That 15% is enough to throw critical loop times off by a wide margin.

IBM's Solution Use the Board Timer

This is not just a problem with Zenith hardware, either. IBM ran into this same problem when they introduced the PC-AT which has both a

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higher performance CPU and a higher clock speed. IBM has officially told all its developers to *not* use software loops for critical timing. Instead, they say to use the system board time chip. In addition to being a more accurate timing source, IBM has also publicly stated that they will keep this chip in its current hardware port location on future models of its PCs. So, you can count on the fact that Zenith will probably do the same on its PCs too.

If software is written properly (using the board timer for critical timing instead of software loops), then the V-20 problems disappear. Fortunately, most new software is now written to use the board timer and bypasses these problems. All the business-oriented software I've run on my Z-150 hasn't choked yet on the V-20. But, be on the watch for games (and some *old* hard disk drivers) that won't work properly.

One Solution: Switchable CPUs and Clocks

If these "software looping" programs are that important to you, you might try to find a "fix" for the problem. One way would be to slow down the "V-20" CPU, so that it runs as fast as an 8088 at 4.77 Mhz. That's not too hard to do, but it defeats the main purpose of having a "V" chip: increased speed.

If you don't want the extended instruction set of the "v" chip (or the CMOS construction or the 8-bit emulation), you might be better off keeping your 8088, and using a switch selectable speed-up "turbo switch" to increase the clock frequency of the CPU. Throw thr switch one way, and you have the 8088 running at 6 to 8 Mhz. Put the switch in the opposite direction, and the clock is back down to 4.77 Mhz. The CPD "Time Works" module is supposed to provide this capability. But, you may want to wait until you've read my "mini-review" of that product before ordering one.

Another solution might be to rig up a "CPU switch" that would allow you to switch in either an 8088 or V-20, depending on which software you are running. It should be possible to rig up a switching board with two forty pin sockets on it and a switching device between the two.

Excellent Public Domain "V" Tutorial Program

For those of you who are interested in finding out more about the technical details of the "V" series of processors, Juan Jimenez, of Micro Consulting Associates, has just written an excellent Public Domain tutorial program in Turbo Pascal. It illustrates the "V" chips extended instruction set in graphics and text. Juan describes all the advanced 16 bit instructions, as well as explaining the B bit emulation mode in great detail. I'll also provide a copy of Juan's program on the same disk with Joan Riff's Z-80 emulator program (as I mentioned earlier), if you can't find it on your local BBS.

Autobooting Zenith ROMs For The Western Digital Controller

Two other of our readers, Paul Abrahams and Dante Bencivengo, wrote describing problems they had with the Zenith Autoboot ROM for the Western Digital controller that I mentioned in this column a few months back. Both had problems with getting the controller to work right after installing the Zenith chip.

Paul, after installing the chip found that he could no longer boot up from the hard disk at all. He kept getting "bad boot sector" errors. Dante couldn't get the hard disk to "PREP" properly.

I should clarify some points about the Western Digital (WD) controllers. As I stated previously, the Zenith ROM (P/N 444-284-3), added to your Western Digital WD-1002-WX2 controller, will allow the H/Z-150 to boot up straight from the hard disk. But, there are some important considerations that you must keep in mind.

Drive Size

First of all, the specific ROM chip mentioned above is usable with *10* Megabyte drives, only! (Sorry I forgot to mention that.) If you are using a *20* Megabyte drive (as both Paul and Dante were), the standard Zenith ROM will not work. You need a different one that is configured for the 20 Meg. drives.

From what I understand, if you want to add a second drive, of *the same size*, to a single WD controller, your existing ROM should do the job for you. For example, if you want to add a second 10 Meg. drive to an existing 10 Meg. system, you merely need a second 34 pin edge connector added to one cable and a second 20 pin cable running from the drive (plus the power supply connection). Similarly, with the 20 Meg. ROM, you can add two 20 Meg drives to the same controller.

The WD controller, itself, will support almost any Winchester, up to several hundred megabytes in size. But, you will need a new, properly configured firmware ROM everytime you go to a different disk size.

The Variety of WD ROMs

Apparently, Zenith never produced a 20 Megabyte ROM for the WD controllers. By the time they started offering 20 Meg. drives for the 150 and 158, they had also decided to use the Xebec controller board. If you contact Zenith or one of their dealers, they will probably tell you to upgrade to the 20 Meg. system by buying the Xebec controller from them (for a few hundred dollars)! Fortunately, there is a better (and cheaper) way.

I called Proto PC, one of the largest dealers of the Western Digital controllers in the country. They told me that they stock custom made Zenith Autoboot ROMs for the WD controllers for drives sizes of 10, 20, and 30 Megabytes. They can also "burn" a ROM to your specs for just about any size Winchester you want to run. They quoted the price for the ROM at $9.50 plus shipping. You can contact them at:

Proto PC Inc.
2439 Franklin Ave.
St. Paul, MN 55114
(612) 644-4660

Proto PC has also been recently advertising an "auto-config" ROM for the WD controllers that appears to handle many different size disks. Apparently, this ROM will allow you to reconfigure the controller capacity directly from the PC's keyboard, eliminating the need for ROM changes for different disk sizes. It doesn't appear that this chip is available in a Zenith auto-boot version (sigh). Contact Proto PC for more information.

"Short Board" vs. "Long Board" WD EPROMs: Same Code, Different Chips

If you are using the WD-1002S-WX2 (the "short board" version), you might also get confused when installing the Zenith ROM chip (or other chip). You can tell whether you are using the WD10002-WX2 or the WD1002S-WX2, by simply looking at the board. The "short board" is only 8 inches long, the "long board" is 13 inches. The "short board" is a later model and is generally the one being sold with most add-on disk systems now.

The two boards are functionally equivalent, except for their sizes. Both boards use EPROM chips (which I refer to as "ROMs"), for their firmware. The long board uses a 24 pin 2732 4K EPROM. The short board has a 28 pin 2764 8K EPROM. Both cards only use about 2K worth of code in lower end of the EPROMs. The rest of the EPROM is left unprogrammed. The required software for both controller cards is exactly the same.

The Zenith ROM chip was meant to be used on a long board version of the controller, so it's a 24 pin version. The boot up code from the long board will run fine in the small board controller. So, you can put the 24 pin 2732 EPROM of a long board into the 28 pin socket of the short board, and it will work.

To install the 2732 EPROM in the small board's larger 28 pin socket, make sure that you align pins 12 and 13 of the 2732 with pins 14 and 15 of the socket. Do not match pin 1 of the EPROM with pin 1 of the 2764 socket! That won't work.

You must put pin 1 of the 2732 in pin 3 of the socket. Pin 24 of the EPROM will line up with pin 26 of the socket. Two socket holes on both rows of the "front" side of the EPROM (denoted by the notch) will be left open, but the EPROM will still work fine. If you have trouble with this, consult a reliable hardware technician. He/she should be able to make the chip swap with no problems.

The CPD "Time Works" Module: Still Needs Some Work

When benchmarking the "V" chip a couple of months back, I compared the V-20 and 8088 running at 4.77 Mhz and then 6.66 Mhz. As many of you saw, there was a significant difference between the 8088 running at 4.77 Mhz and the V-20 running at 6.66 Mhz. I have gotten several comments and questions about the brief reference I made to the CPD (Consumer Product Development) "Time Works" speed-up module in that article.

Robert Maskasky writes:

"I read your article in the January issue of the *Computer Shopper* on Z-150 speed. ...I have been looking for a way to increase the speed of my Z-150. I have received tech data on the Time Works Speed Kit, and I was very disappointed in the data. I was expecting an 8 Mhz hit after reading some ads in the *HUG REMARK* magazine. I have also read articles stating that with the kit installed, the DOS FORMAT routine does not work at fast speed. Please keep us informed of new developments in the quest for Z-150 "turbo speed."

Ted Robinson also writes: "I also got the "Time Works" speed-up kit which I am unable to get to work. I've sent them two letters asking for help and have recieved no reply. I have version 1.8A ROM Bios...do you think that could have anything to do with the speed-up not working? If not, do you have any suggestions or things to try?

All I can say at this point, is that my experience with the CPD "Time Works" module has been about the same as our readers. Here is a synopsis of what I've experienced using this speed up module:

After I saw CPD's ads for the H/Z-150 speed up module in *Sextant* magazine, I contacted them about doing a review for the *Computer Shopper* magazine. They promptly sent me a module for review.

After opening the package and reading the installation instructions, I was surprised to find out that the speed module was not an 8 Mhz. speed up, but only 6.66 Mhz. Yet, even that appeared to be an improvement over the standard CPU speed.

Installing the "Time Works" Module

The CPD module consists of a small "piggyback" PC board, a couple of IC chips, a crystal, and a wire-wrap length DIP socket. To install the CPD module, you remove the 8284A clock generator (U-211) from the H/Z-150's CPU board, insert it into the socket on the Time Works board, and then plug the Time Works board back into the 8284's original socket.

Wired to the Time Works piggyback board is a small switch mounted in a back-panel filler that fits in the back of the H/Z-150's chassis. The switch allows you select either a clock speed of 4.77 Mhz (normal) or 6.66 Mhz. You have to make your selection when the computer is turned off, you can not switch CPU speeds while the computer is running or you will get a system crash.

I had no problem with installation of the Kit, but I didn't find the diagrams anywhere that the documentation constantly referred to. Perhaps the docs I received were "pre-release." Since I was fairly familiar with the 150's CPU board, it was no problem in finding the right chip, getting it out and into the socket, etc. If you have built your own 150 or are familiar with the CPU board, you shouldn't have any problems either. Just remember to keep pin #1 of the chip oriented correctly.

Five Minutes of Power...Then....

The CPD module worked perfectly in the 4.77 mhz mode. But, when I kicked it into the higher speed (before turning the machine on, of course), there were some problems. If my machine was "cold started" after sitting for at least an hour or so, the thing worked fine at the higher speed. Power up went o.k., the

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Periscope
The Undercover Debugger

by Andrew M. Fried

This month I want to turn my attention away from the myriad of applications programs that are available for the IBM PC family of computers and highlight acouple of the professional software developement tools which make complex software packages possible.

There is a lot of talk about high level languages these days; so much so that some forget that the computer's only language is neither "high level"or "user friendly." I'm referring to, of course, machine code.

Since we mortals encounter great difficulty in comprehending the inexhaustable stream of zeros and ones which make up binary machine code, we rely on various interfaces to decipher the data into terms we can understand such as hex code or assembly code mneumonics.

Using these interfaces, we are able to look into existing programs and discover the source of bugs. We may also wish to modify a program for which we don't have the original source code (patches and fixes) or try to trace program execution for bugs and glitches. No matter what the reason, the toolswe need are referred to as "debuggers."

This month, I am going to discuss a software debugger written by Brett Salter called PERISCOPE. I will follow this up the following month with a review of a hardware debugger manufactured by Atron.

Debuggers

Debuggers currently on the market offer a wide range of features and prices, but there are several characteristics which most share. Most debuggers perform, to varying degrees, the following:

Assembly Code (in mneumonic form)

Dissassemble Code (COM,EXE,drivers, etc)

Modify Code

Trace program execution

Search segments for data or strings

Dump memory in ASCII and HEX formats

Provide program breakpoints

Because most of what debuggers do is done at the assembly level, a knowledge of the hardware and 8088 assembly code for the PC is usually a prerequisite to effectively utilizing this tool.

Since PERISCOPE is a symbolic debugger, it will accept the public symbols created by the linker and permit your unassembled program to display symbols rather than the standard meaningless offset numbers. PERISCOPES symbolic support is available on most of the IBM and Microsoft compiled languages likeC, Fortran and Assembly.

What makes PERISCOPE better than most debuggers is its support for various methods of providing breakpoints (ways of stopping program execution) including a hardware breakout switch. The hardware breakout switch is designed to cause a non-maskable interrupt when pressed, which uses interrupt 2 to pass control to the debugger.

Another interesting feature of the Periscope I package is what the developer calls the"Submarine Board." This is a board which contains 8K of RAM that isinstalled inside your PC. The memory is accessable only through ports. Thisis done to prevent a program from overwriting the debugger's critical code,making PERISCOPE almost as effective as some of the hardware debugger boards.

The PERISCOPE II package is almost identical to the first except that the memory board is missing and a different switch configuration is present. The software is almost identical, except the version number is usually followed byan 's'. The only operational difference between the two packages lies in the ability of PERISCOPE I, with the memory board, to be more resistant to programs overwriting its code.

continued on page 89

Mainframe
continued from page 42

Enhanced console support including ANSI3.64 controls, color support, sound support, and mouse support.

An indexed data management access method that is integrated into the base UNIX file system.

Other extensions that permit use of the powerful virtual storage support. This allows the ability to map a file into a 256 megabyte virtual address space and access it with loads and stores, versus reads and writes.

CONCLUSIONS: With the RT PC family of computers, IBM has executed an end-run around the world of PC clones. This is not a system that will be easy to copy. While IBM presents the RT PC as a computer family for engineering and design, it clearly has the potential for use in DP departments where IBM mainframe computers provide corporate computing power. It also answers the problem of integrating the PCs into the mainframe environment.

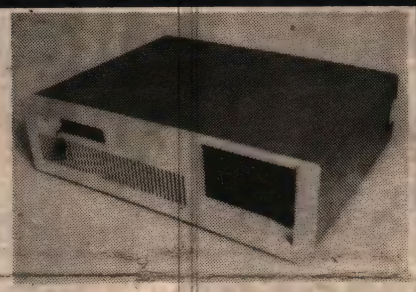
Price-wise, this family of advanced computers is reasonable for the power provided. Although it must be pointed out that this system does not exceed the potential of the 68000 family, it does exceed what has been provided by vendors using that CPU. IBM controls the prices of their PC line and system 36 and System 1 lines. When they fully develop this system, I believe it will be recognized as a landmark in the industry. ●

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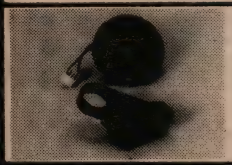
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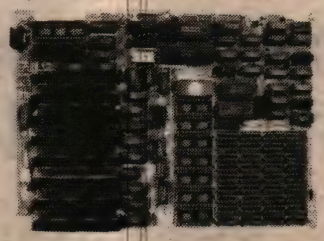
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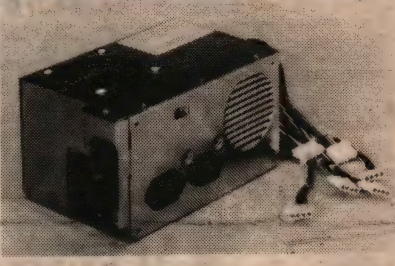


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Multiplan Microsoft Updates

by Dr. Michael W. Ecker

With the introduction of version 2 of Multiplan, Microsoft has expanded and improved upon its popular and successful spreadsheet program for IBM-PCs and compatibles. The new release is bigger, faster and contains a better manual. It supports some of the newer technology, and it includes macros. I'll discuss these points and more in this review.

Is Bigger Always Better?

The price one must pay for such improvements is really not monetary; it seems to be in memory capacity. Don't get me wrong, I'm not complaining. In fact, I was generally impressed with my review copy from Microsoft, which I tested on my 256K (soon to be 512K) Tandy 1000. The program manual states that 128K RAM is sufficient, but I don't see how it can be, as the program showed only about 68K available after I loaded Multiplan. Perhaps I am jumping to conclusions in assuming that DOS and Multiplan eat up all the rest of RAM. If not, then why can't more be used for Multiplan templates and worksheets? If so, then how can a 128K machine suffice?

Never mind. Let's look instead at how Multiplan works, looks and feels. For the last two, the package comes in a clear plastic box with appropriate packaging material. This is the same case Microsoft uses in other packages, such as for its word processor, *Word*. A simple flip and the plastic box becomes a stand for the manual, a nice touch.

Inside this plastic box are the disks and manuals. The disks are not copy-protected, a pleasant surprise for this $195 package. (By contrast, Lotus' 1-2-3, the industry leader, is protected and sells for $495. I'm not arguing that Lotus isn't still terrific as a result; I'm only making an observation.) The manual is of the familiar three-ring binder type and of professional quality.

Following instructions in the manual, I installed and backed up Multiplan for the Tandy 1000. Loading is easy: just type MP from DOS Ready with the Multiplan program disk in your logged drive (presumably drive A). You may also load a worksheet, such as one of the samples Microsoft provides with Multiplan. I chose to work with the loan amortization template, because I've had considerable experience with this sort of program for spreadsheets and in Basic, particularly when writing my own. So, I loaded the AMOR.MOD file. (Microsoft evidently thinks of templates as models, an apt choice, thus leading to the MOD extension.)

In playing with this model, I learned a lot about Multiplan during those several hours. One thing that I like about Multiplan is something that was missing in VisiCalc (making me hate it) — full words for the commands. Maybe it's not a big deal to somebody who uses spreadsheets all the time, but it is a big deal to me. Who can remember, or wants to remember, ABCDEFIJK etc.? Knowing how to use a spreadsheet is sufficient challenge, thank you. So, I'm glad MP uses the full words, such as Alpha (not just A), Blank (not just B), and so on. Lotus' menu contains this feature as well, and I'm fond of that program. SuperCalc 3 Release 2, on the other hand, seems to lack it, and this has caused me to avoid giving that program a fair chance; it's as though I were putting it in the same category as lumbering dinosaur VisiCalc--at least in my own mind. I wonder whether readers share my stong feeling about this criterion. Am I making too big a deal of this? In any case, I'm glad that Multiplan uses the full words.

The next thing I observed is that Multiplan's command menu, unlike most of the other

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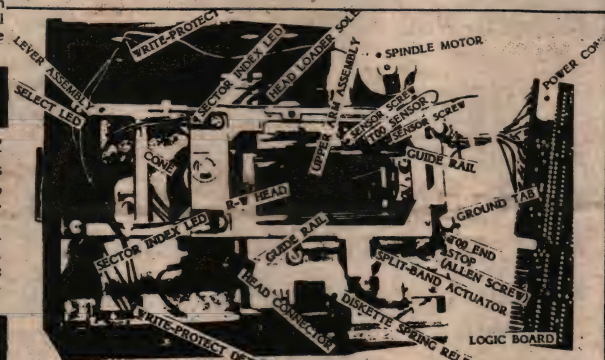
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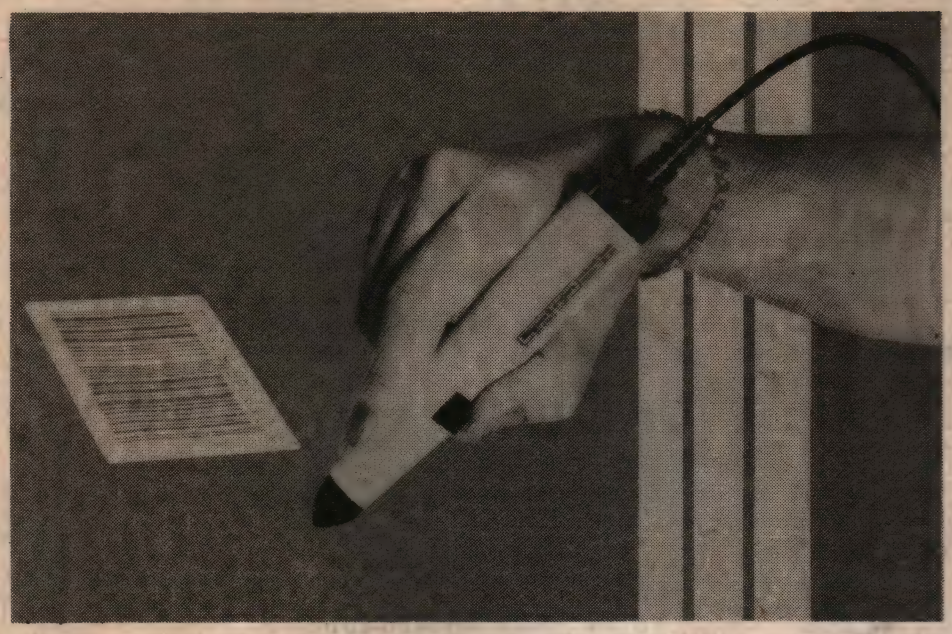
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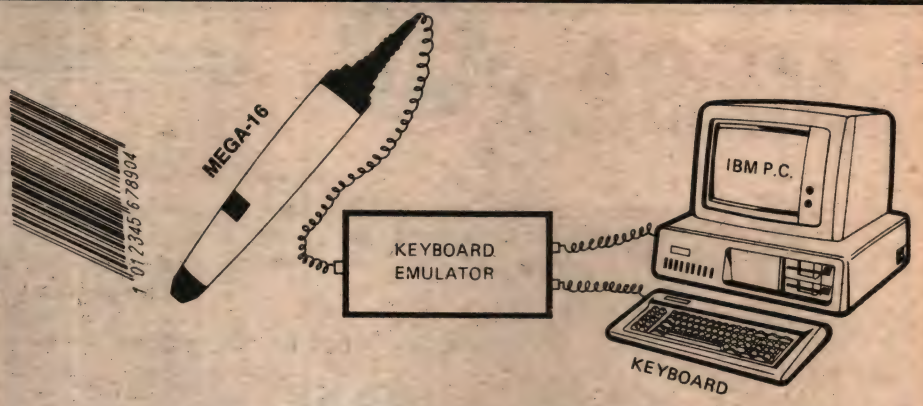
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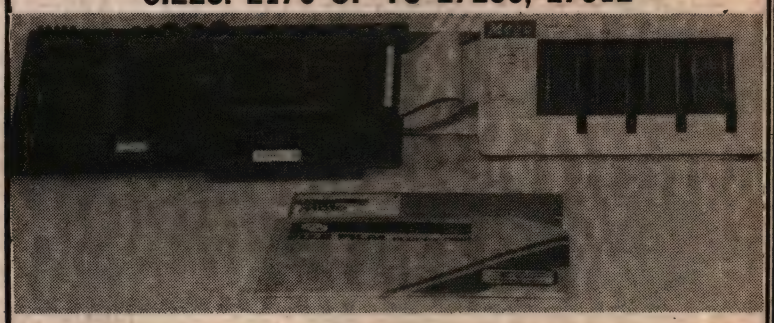
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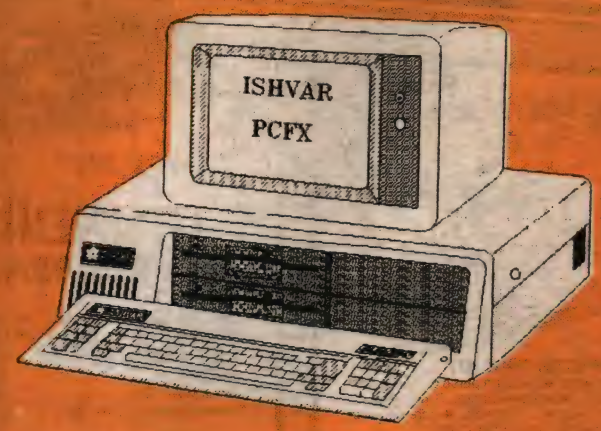
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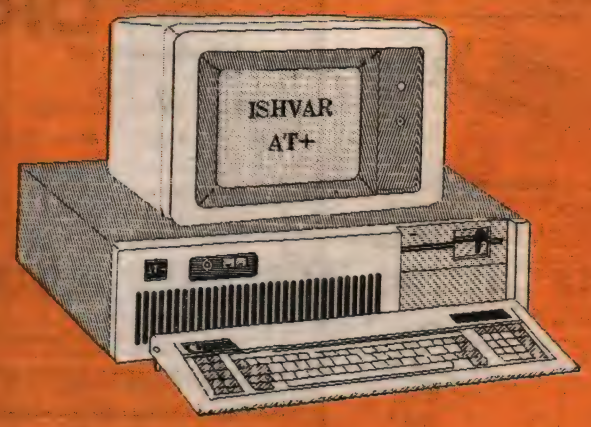
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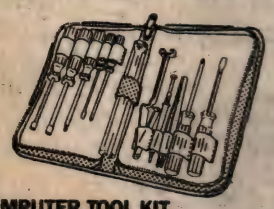
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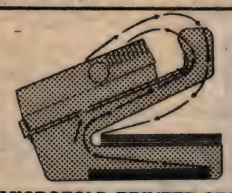
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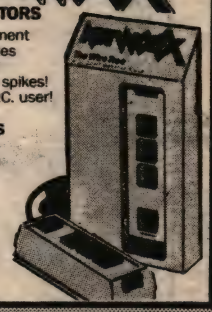
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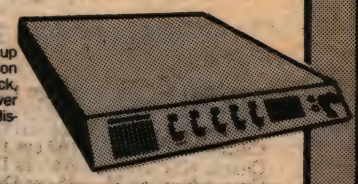
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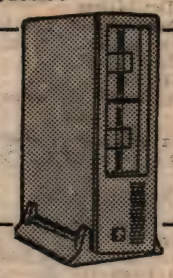


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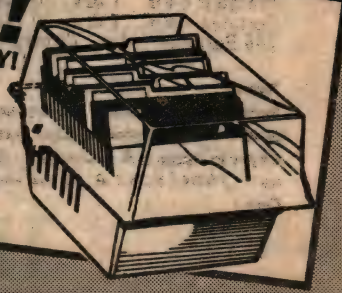
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Multiplan Version 2 continued from page 77

spreadsheets I've encountered, is always active. This is neither inherently superior nor inferior. I should clarify that this means that, after each cell entry, Multiplan is poised to accept a command, rather than enter data, as in 1-2-3, for instance. Thus, for each cell, first MP must be told to enter alphabetic or value information, copy or move data, get help, insert or delete, print, sort, and so on. Then implement the choice.

Personally, I prefer not to have this arrangement. (I have not yet looked into whether there is any option to customize to avoid it.) I should point out that my reason for saying this is that I would think that people are entering data most of the time. Hence, I would prefer to activate special commands, such as copying and so on, with data entry being the default. True, I did find that entering a number would automatically throw me into the value mode; so, much of the basis of my objection does not exist.

However, such is not the case for labels, as the first letter typed could be construed as the first letter corresponding to a command.

In changing modes, since the arrows keys are still active for changing the present cell location of the cursor, they are not used. Instead, use the space key to change modes rather than type the first letter of the command word. When the space key is used, the selected mode is highlighted. If you make a choice, there are usually some follow-up options, and if when wishing to back out, the escape key (ESC) will get you out.

The more I played around, the more I found myself making comparisons to Lotus 1-2-3, to SuperCalc 3, to VisiCalc, and to MyCalc, (a lesser known but inexpensive alternative from the Soft Toolworks). And I realized that comparisons become quite subjective after a while. In the case of Multiplan, the question is largely one of implementing the familiar power tools of spreadsheets in different ways. Each such choice represents certain advantages and disadvantages. My general sense was that a person who had no experience with spreadsheets could learn to use Multiplan reasonably well and quickly. And at $195, he or she could appreciate savings while sacrificing little or nothing in the way of power.

Speaking of power, I learned a bit about how to create macros specifically for this review. Recall that a macro is a command in which a few keystrokes represent many. Macros are useful in situations where the same, or same kind of, entry is involved, over and over again. I came across a personal application when I decided to modify the amortization template (AMOR. MOD) to print my own home mortgage. I soon discovered that I could learn MP's method of handling ranges, particularly for copying, but such was not what I needed for the way I wished to implement an annual summary of interest. Thus, I came to think of creating a macro. I wanted the template to compute the sum of each year's interest payments, print it in an appropriate place, go down 12 spaces for the next year in this monthly scheme, and so on. Without a macro, I'd have had to implement this manually for a 20-year period, something decidely counter to the whole point of a computer as a helpful tool. (For technical reasons, the copy commands seemed to be more trouble to me in this one instance.) I should report that I got the template to work almost perfectly at first sitting. Had it

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PC-DOS — Introduction To High Performance Computing

by Tom Garcia

A few months ago, I suddenly found myself in the market for a good book on the ins and outs of MS-DOS. Here is how that happened: I had ordered a PC-XT clone, and just before it arrived, I discovered from a friend (who had ordered the same model) that the computers were shipping with operating system packages, but with the manuals "to follow" at an unspecified later date. No problem for me though since there is a big bookstore at the local shopping mall, and they stock lots of computer books.

I had thought that finding a suitable book would be a simple and straight forward task, but there were too many MS-DOS (or PC-DOS, same thing) books, and things became a little confused as I couldn't decide which text to buy. Then, down on the ATARI shelf, out of the section that it should have been in, a blue cover with an embossed gold floppy disk caught me eye. *PC-DOS — Introduction to High Performance Computing* by Peter Norton. Yes the Peter Norton, of Norton Utilities fame. His name on the cover sold me in an instant, and I plunked down my $17.95.

During the next few days I read the first three or four chapters and developed a feeling of confidence concerning my ability to get up and running when the PC arrived. And, it did work out that way. Just as I was cracking Chapter Five, the UPS delivery truck pulled up in front of the house and dropped off the boxes. It was time to put theory into practice. At this point Norton's book became more of a reference than a "read me from front to back" study guide. Fortunately, the book has an excellent index, so every time a question came up I could flip to the appropriate section and get a quick answer, either in the text or via a bold print example of the DOS command that I was curious about.

Here is what you will find in the 324 pages and 23 chapters of the softcover book: A section ("Basic Computer Concepts") on what a computer is and what kind of work it can do, somewhat superfluous to many readers, but interesting to a beginner. Then just what you might be expected (and demanded) in an introductory manual, all about FORMATting, backups, and switching drives, very handy stuff. The numerous little MS-DOS external programs such as CHKDSK, DISKCOPY and SYS are given their due share of time in Norton's spotlight.

In the middle of the book you will find out about MS-DOS features that are not going to be of much interest unless you have (or till you upgrade to) a hard disk. Subdirectories and paths are items in this category. It's rather deep stuff and points out that this book will be of value to you further down the pike, not just as an initial introduction to the world of MS-DOS. Batch files are a little further along, and those jewels are something you can have a lot of fun with if you can just get started with them. There is enough info on the operating system's built-in line editor, EDLIN, so that you can create any AUTOEXEC.BAT batch files that you might want to whip up. The DEBUG program receives good coverage, a whole chapter in fact.

Now to the "nothings perfect" department. The day after I fired up the PC, I went out and bought a brand new piece of just-released software that had received instant rave reviews in the press. It wouldn't run, and the error message said, "Install ANSI driver." Norton's book didn't shed much light on my problem beyond telling me that the ANSI.SYS device driver "can do some wonders for us." (The manual that came with the software did not mention the required corrective action either.) I had to get a friend of mine to show me how to use CONFIG.SYS to install ANSI.SYS. The text material concerning the MODE command could also be improved. Norton's word on MODE is that it can "take care of some annoying details" (it sure can). But, there are no examples provided so that you can actually use MODE without going to some other source for the details.

There is much more covered in the book, but it will suffice to say, that's even though there are a few minor problems, you will surely find enough of interest to make the book a worthwhile purchase for your computer library. The ebst thing about Peter Norton's style is that he writes in plain English, not computer jargon. His PC-DOS book is filled with practical advice and counsel, and it is in a compact desk top size too, 9¼x7 inches.

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Lotus Development Corporation and Microsoft Corporation announced recently that Lotus™ will support Microsoft Windows by developing future applications that utilize Microsoft's graphic interface product. Microsoft Windows extends the features of the DOS operating system by providing a foundation for a new generation of applications which are enhanced through the use of pictorial representations and rich formats for text.

"We believe in graphical user interfaces for many of our future applications," said Mitchell D. Kapor, Lotus chairman. "We are already developing entire new families of products which take advantage of Microsoft Windows. It's important to emphasize, however, that we will continue to support and enhance character-based interfaces for our existing products, as well as for some future products not yet announced."

"We have had an ongoing working relationship with Lotus and are pleased by its public support of Microsoft Windows," said Bill Gates, chairman of the board of Microsoft. "Lotus has spent a great deal of time over the past year developing software under Microsoft Windows and has given us invaluable feedback on both the program and user interfaces." Its agreement with Microsoft allows Lotus to distribute, with its products, those portions of Microsoft Windows needed to run the Lotus software.

For further information contact Microsoft Corporation, 10700 Northup Way, Box 97200, Bellevue, WA 98009. Mention that you read about it in *Computer Shopper*. ●

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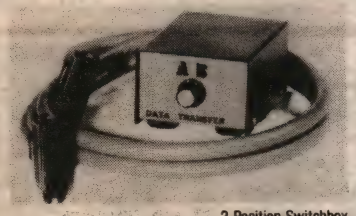
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Multiplan Version 2
continued from page 82

not been necessary to complete this review, I am sure I could have tweaked my program into shape, massaging it here and there. I found the creation of MP macros to be not nearly as difficult or as dreaded as I had thought.

One negative experience I should report is that I lost two hours of work on this template after exiting MP. I do not recall whether or not I had properly saved it, but both my data disk and backup disk reported unreadable files when I attempted to load them from Multiplan. What is frustrating is that the files are evidently of ASCII type, because I was able to read them with the TYPE command using DOS 2.11, and the whole table was there to see. I tried to use the Norton Utilities to recover them, but and inexperience with that program, or something bizarre with my problem, yielded no results. I did not try to use a word processor, as I would not have known what format I was trying to reassemble. Thus, I just re-did things from memory. Had I not been a tyro regarding MP, perhaps the loss would have been less time-consuming in terms of reproducing my worksheet.

Having heard scary stories from colleagues in the computer trade press, I had become concerned about whether some a bug planted by a disgruntled Microsoft employee had played some role. I wish to emphasize that I have no evidence of this, but feel I should recount this experience so that I not be accused of whitewashing what could possibly be a problem. I do hope I am wrong and that I committed some error that would explain what happened. I have not had any problem since that day, but I don't use MP on a regular basis.

Other Features And Aspects Of Use Of MP

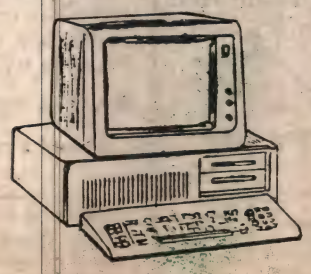
Multiplan 2 is an upwardly compatible version of the previous version, reportedly 1.04. Files created by version 1 reportedly can be read either directly into version 2, without need of conversion, or via a transfer/conversion module. In either case, it would appear that Microsoft has managed to avoid the complaints that Lotus has had with its version 2 upgrades, which are not totally compatible with those of version 1-A.

MP's size is a respectable 4095 rows by 255 columns. Calculate for yourself how many cells this allows over a million!). Memory limitations will probably cause a halt long before the MP cells are used. I found that my modified template used 252 rows by 4 to 5 columns, and the resulting file was from 24K to 30K in size, for instance.

MP uses numbers for its columns as well as its rows, while the competitors use letters for columns and numbers for rows. This, too, represents an option that need not be considered better or worse, but

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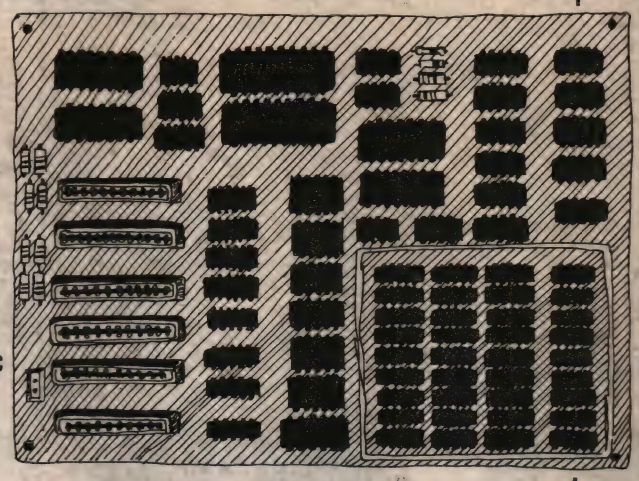
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- WILL RUN ANY COMPATIBLE BASIC
- IBM POWER PLUG COMPATIBLE
- SAME SIZE AS XT MOTHER BOARD
- RUNS PC DOS AND CPM 86
- COMPATIBLE BIOS IN STOCK



WIRED NO IC'S
$99.00

2 and 2 is four, right? Not here it isn't. This IBM XT compatible motherboard takes 2 rows of 256K RAM, adds it to 2 rows of 64K RAM and gives you a total of 640K RAM of memory! (Up to 1 Megabite available with special software). It's the Queen of the motherboards endowed with the same features as the original MBE-XT board, including size and hole spacing. She works great with our IBM type power supply.

BARE BOARD $49.00

MBE-XT
AN IBM® XT COMPATIBLE 8 SLOT MOTHERBOARD

- 8088 16 BIT MICROPROCESSOR
- 8087 MATH PROCESSOR, OPTIONAL
- UP TO 256K DRAM ON BOARD
- HAS DIGITAL DELAY LINE FOR ERROR FREE MEMORY REFRESH
- 8 IBM COMPATIBLE EXPANSION SLOTS
- 4 DMA AND TIMER CHANNELS
- 65K/128K EPROMS JUMPER SELECTABLE
- WILL RUN ANY COMPATIBLE BASIC
- IBM POWER PLUG COMPATIBLE
- SAME PCB SIZE AS IBM XT
- RUNS PC DOS AND CPM-86
- COMPATIBLE BIOS IN STOCK

MBE-XT BARE PCB WITH MANUAL AND SCHEMATICS $39.95

Continuous soldering of intricate little parts makes me ornery and it makes my tio wander. It's called solderitis and it drives my wife crazy. The cure? These MBE-XT boards. They're complete except for IC's and RAM. Get a hold of some IC's, BIOS and RAMS, plug them in and you are in business. Good buy solderitis. $159.00

FULLY WIRED AND TESTED WITH 64K ON BOARD WITH MEGABIOS AND MANUAL $295.00

IBM type KEYBOARD

This keyboard is the spittin image of the real McCoy and it works exactly like it too. Great keyboard for your IBM compatible projects or use it as an excellent replacement of the original McCoy.

ONLY $79.95





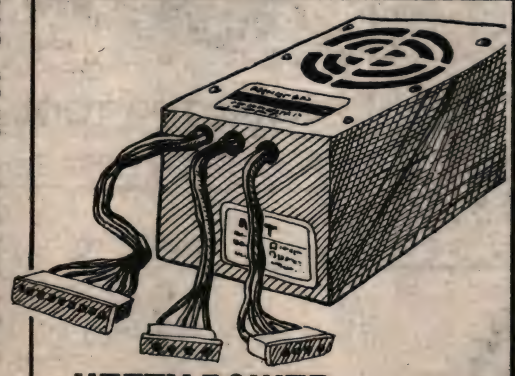
IBM CASE
$59.95

We have the perfect case for the IBM type bithead. These are exact duplicates of the original, great for replacing that damaged original your secretary sat on. The lid is hinged with pushbutton access, the back is cut for 8 XT slots. They come complete with case back insert for cards, card guides, blind disc filler plates, standoffs, feet and screws, all for $59.95.

Please specify back or side cutout for power supply.

We also have an IBM 8 Slot/6502 Board dual duty case for making IBM look-a-like 6502 systems $79.95

MEGABOARD CASE, similar to the above, but no pushbuttons or hardware, from DRC in Dallas, Texas. A stronger US made case (naturally), but less finishing parts. Fits the MEGABOARD exactly with side cut extender, for back power supply $89.95



HEFTY POWER SUPPLY
RETROFITS IBM

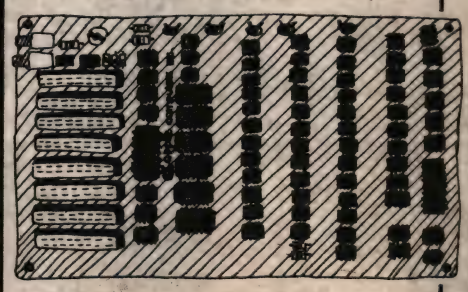
+ 5V @ 15 AMPS
+12V @ 45 AMPS
+ 5V @ 05 AMPS
-12V @ 05 AMPS

Put more muscle in your IBM or IBM compatible. This heavy duty power supply can handle up to 4 disc drives. It's complete with all necessary connectors, and rarin to go. All you have to do is round up some more disc drives.

EXACT FIT TO OUR PC/XT CASE
$99.00

130 WATT 4 Drive Connectors

APPLE STUFF - CUT TO THE CORE!



6502 APPLE™ TYPE MOTHER BOARD

A high quality bare board, the 6502 is a personal computer based design. It utilizes 74LS245 octal buffers and 2716 or 2732 eproms, upper and lower case 48K RAM on board. Component placement and identification silk-screened on board for easy assembly. Use quality components, and you'll have a mother of a board when you get done with this one.

$19.95

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2 for $9.00 OR $4.95 ea.

DISC CONTROLLER. Runs DOS 3.3 and two Apple™ type disc drives.
COMMUNICATIONS CARD. Another RS-232 for modems, etc.
GRAPHICS CARD FOR CHARTS. Prints charts and other interesting graphics.
16K CARD ADDS MORE MEMORY. Increases memory by 16K, can be used with CPM, allows you to run more complicated games and programs.
80 COLUMN (UDX) CARD. Change your 40 column display to 80. See more copy on your display, great for word processing.
Z-80 CARD RUNS CPM™. Run CPM™ on your Apple™ and increase software compatibility. Tons of CPM™ software is available.
128K CARD FOR EVEN MORE. Outer space card under software control, can be used as a pseudo disc, etc.
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PRINTER BUFFER. Free up your computer, 16K-64K worth of buffering.
PRINTER INTERFACE. Parallel printer interface card, can be used with most printers.
CLOCK CARD KEEPS TIME. Teach your Apple™ to tell time.
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RS-232 SERIAL CARD. For printers requiring serial port interface.

TELEX 466735 RAMSEY CI

TERMS: • satisfaction guaranteed • examine for 10 days, if not pleased, return in original form for refund • add 6% for shipping and insurance to a maximum of $10.00 • overseas add 15% for surface mail • COD add $2.50 (COD to USA only) • orders under $15.00 add $1.50 • NY residents add 7% sales tax • 1 year warranty on wired units except where noted

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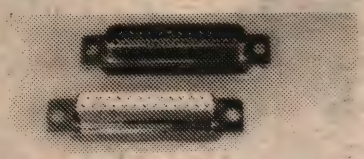
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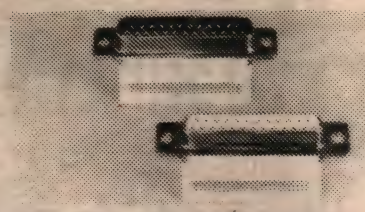
RAMSEY ELECTRONICS, INC.
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D—SERIES CONNECTORS



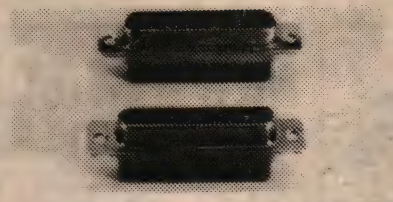
SOLDER POT

PART #	DESCRIPTION	PRICE/QTY 1-49	50-99	100-499
9P	9 pin male	0.84	0.76	0.70
9S	9 pin female	0.96	0.87	0.80
15P	15 pin male	0.96	0.87	0.80
15S	15 pin female	1.10	1.00	0.92
25P	25 pin male	1.10	1.00	0.92
25S	25 pin female	1.20	1.09	1.00
37P	37 pin male	1.64	1.49	1.37
37S	37 pin female	1.80	1.64	1.50
50P	50 pin male	2.62	2.38	2.18
50S	50 pin female	3.70	3.36	3.08



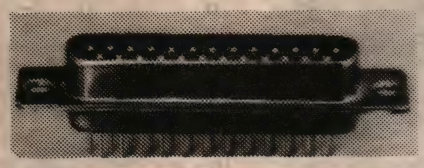
RIBBON CABLE TYPE

PART #	DESCRIPTION	PRICE/QTY 1-49	50-99	100-499
IDC9P	9 pin male	2.35	2.17	2.01
IDC9S	9 pin female	2.53	2.34	2.17
IDC15P	15 pin male	3.10	2.86	2.66
IDC15S	15 pin female	3.25	3.00	2.79
IDC25P	25 pin male	3.73	3.45	3.20
IDC25S	25 pin female	4.28	3.95	3.67
IDC37P	37 pin male	4.75	4.38	4.07
IDC37S	37 pin female	5.63	5.20	14.83
IDC50P	50 pin male	12.98	11.98	11.13
IDC50S	50 pin female	14.47	13.35	12.40



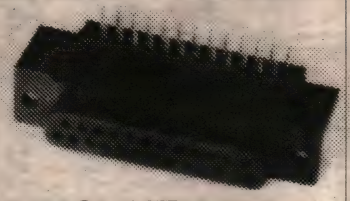
EMPTY CRIMP SHELLS

PART #	DESCRIPTION	PRICE/QTY 1-49	50-99	100-499
C9P	9 pin male	0.70	0.62	0.56
C9S	9 pin female	0.70	0.62	0.56
C15P	15 pin male	0.73	0.64	0.58
C15S	15 pin female	0.73	0.64	0.58
C25P	25 pin male	0.75	0.67	0.60
C25S	25 pin female	0.75	0.67	0.60
C37P	37 pin male	0.96	0.87	0.80
C37S	37 pin female	1.00	0.91	0.83
C50P	50 pin male	1.12	1.02	0.93
C50S	50 pin female	1.14	1.04	0.95



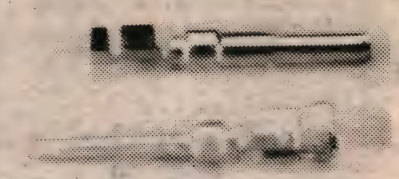
PC MOUNT STRAIGHT

PART #	DESCRIPTION	PRICE/QTY 1-49	50-99	100-499
P9P	9 pin male	0.90	0.82	0.75
P9S	9 pin female	1.38	1.25	1.15
P15P	15 pin male	1.12	1.02	0.93
P15S	15 pin female	1.98	1.80	1.65
P25P	25 pin male	1.56	1.42	1.30
P25S	25 pin female	3.06	2.78	2.55
P37P	37 pin male	2.14	1.95	1.78
P37S	37 pin female	4.36	3.96	3.63
P50P	50 pin male	2.74	2.49	2.28
P50S	50 pin female	5.68	5.16	4.73



PC MOUNT RIGHT ANGLE

PART #	DESCRIPTION	PRICE/QTY 1-49	50-99	100-499
R9P	9 pin male	1.60	1.45	1.33
R9S	9 pin female	1.62	1.47	1.35
R15P	15 pin male	1.52	1.38	1.27
R15S	15 pin female	1.54	1.40	1.28
R25P	25 pin male	1.96	1.78	1.63
R25S	25 pin female	1.98	1.80	1.65
R37P	37 pin male	2.94	2.67	2.45
R37S	37 pin female	2.98	2.71	2.48



CRIMP CONTACTS

PART #	DESCRIPTION	PRICE/QTY 1-99	100-999	1K-4999
CP20P	male contact	0.080	0.063	0.050
CP20S	female contact	0.100	0.068	0.054



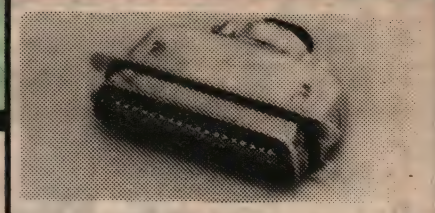
CRIMPING TOOL

CT-1645	professional ratchet type	79.95



EXTRACTOR TOOL

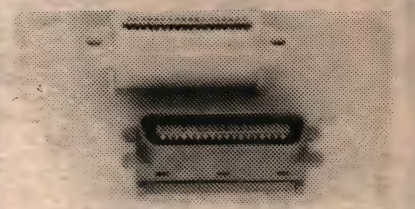
EXT-1	removes crimp contacts	2.75



CENTRONICS SOLDER TYPE

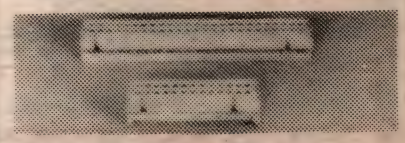
PART #	DESCRIPTION	PRICE/QTY 1-49	50-99	100-499
CEN-36P	36 pin male	3.00	2.67	2.40
CEN-36S	36 pin female	3.66	3.33	3.05

RIBBON CABLE CONNECTORS



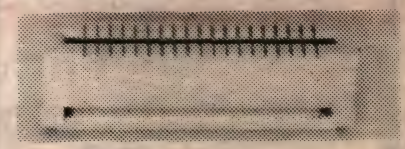
57 SERIES

PART #	DESCRIPTION	PRICE/QTY 1-49	50-99	100-499
ID57-24P	24 pin male	5.00	4.62	4.29
ID57-24S	24 pin female	5.50	5.08	4.71
ID57-36P	36 pin male	4.25	3.78	3.40
ID57-36S	36 pin female	5.50	5.00	4.58
ID57-50P	50 pin male	8.03	7.42	6.89
ID57-50S	50 pin female	7.52	6.94	6.44



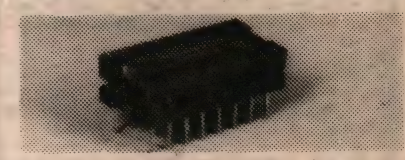
IDS SOCKET CONNECTOR

PART #	DESCRIPTION	PRICE/QTY 1-49	50-99	100-499
IDS10	10 pin socket	0.94	0.85	0.78
IDS14	14 pin socket	1.00	0.91	0.83
IDS16	16 pin socket	1.12	1.02	0.93
IDS20	20 pin socket	1.18	1.07	0.98
IDS26	26 pin socket	1.50	1.36	1.25
IDS34	34 pin socket	1.78	1.62	1.48
IDS40	40 pin socket	1.98	1.80	1.65
IDS50	50 pin socket	2.32	2.11	1.93
IDS60	60 pin socket	2.70	2.45	2.25



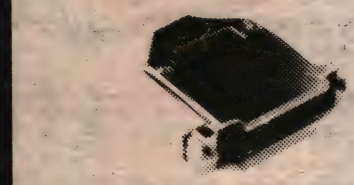
IDE EDGECARD CONNECTOR

PART #	DESCRIPTION	PRICE/QTY 1-49	50-99	100-499
IDE10	10 pin edg.crd.	1.30	1.16	1.04
IDE14	14 pin edg.crd.	1.55	1.38	1.24
IDE20	20 pin edg.crd.	1.75	1.56	1.40
IDE26	26 pin edg.crd.	2.13	1.89	1.70
IDE34	34 pin edg.crd.	2.50	2.22	2.00
IDE40	40 pin edg.crd.	2.88	2.56	2.30
IDE50	50 pin edg.crd.	3.50	3.11	2.80



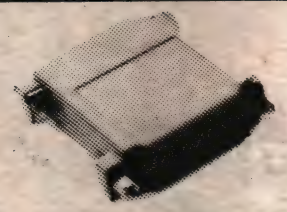
IDD DIP PLUG CONNECTORS

PART #	DESCRIPTION	PRICE/QTY 1-49	50-99	100-499
IDD14	14 pin dip plug	0.85	0.77	0.71
IDD16	16 pin dip plug	0.95	0.86	0.79
IDD24	24 pin dip plug	1.65	1.50	1.38
IDD40	40 pin dip plug	2.75	2.50	2.29



GREY HOODS

PART #	DESCRIPTION	PRICE/QTY 1-49	50-99	100-499
GH9	9 pin hood	0.68	0.60	0.54
GH15	15 pin hood	0.80	0.71	0.64
GH25	25 pin hood	0.85	0.76	0.66
GH37	37 pin hood	1.06	0.96	0.88
GH50	50 pin hood	1.10	1.00	0.92

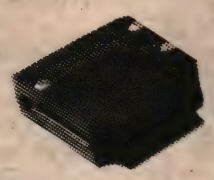


DUAL HOODS

PART #	DESCRIPTION	PRICE/QTY 1-49	50-99	100-499
DH25	25 pin hood	1.13	1.00	0.90
DH37	37 pin hood	1.17	1.04	0.94

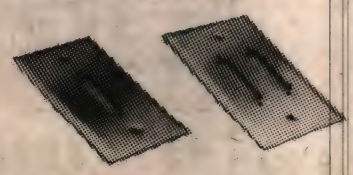
D-SERIES HARDWARE

PART #	DESCRIPTION	PRICE/QTY 1-49	50-99	100-499
MDH-1	male d-series hardware	0.55	0.35	0.25
FDH-1	female d-series hardware	0.75	0.65	0.55



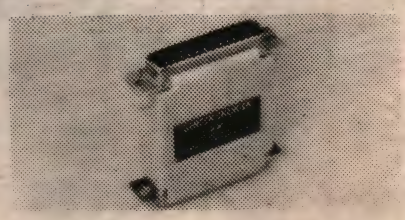
AMP HOOD

PART #	DESCRIPTION	PRICE/QTY 1-49	50-99	100-499
AH25	25 pin hood	1.25	1.00	0.83



RS-232 WALL PLATES

PART #	DESCRIPTION	PRICE/QTY 1-9	10-24	25-49
WP-1	one slot	1.88	1.36	1.25
WP-2	two slot	2.13	1.55	1.42



RS-232 GENDER CHANGERS

PART #	DESCRIPTION	PRICE/QTY 1-9	10-24	25-49
AGC-M	male gender changer	7.95	7.27	6.67
AGC-F	female gender changer	7.95	7.27	6.67

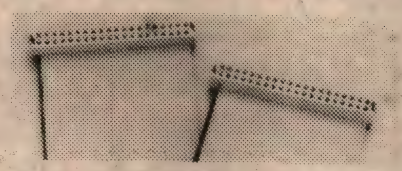
ALTEX ELECTRONICS

RIBBON CABLE ASSEMBLIES



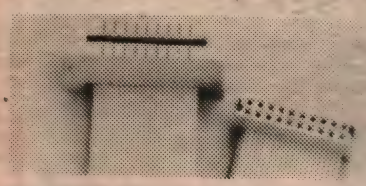
D-SERIES

PART #	DESCRIPTION	PRICE
9P-9P	9 pin male to male	5.64 + .18 per ft.
9P-9S	9 pin male to female	5.86 + .18 per ft.
9S-9S	9 pin female to female	6.08 + .18 per ft.
15P-15P	15 pin male to male	7.44 + .30 per ft.
15P-15S	15 pin male to female	7.62 + .30 per ft.
15S-15S	15 pin female to female	7.80 + .30 per ft.
25P-25P	25 pin male to male	8.96 + .50 per ft.
25P-25S	25 pin male to female	9.62 + .50 per ft.
25S-25S	25 pin female to female	10.28 + .50 per ft.
37P-37P	37 pin male to male	11.40 + .74 per ft.
37P-37S	37 pin male to female	12.46 + .74 per ft.
37S-37S	37 pin female to female	13.52 + .74 per ft.
50P-50P	50 pin male to male	25.96 + 1.00 per ft.
50P-50S	50 pin male to female	27.45 + 1.00 per ft.
50S-50S	50 pin female to female	28.94 + 1.00 per ft.



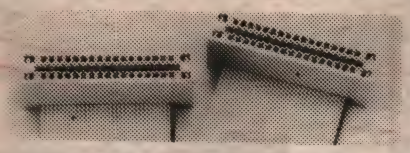
IDS SOCKET TO IDS SOCKET

PART #	DESCRIPTION	PRICE
10S-10S	10 pin socket to socket	2.00 + .20 per ft.
14S-14S	14 pin socket to socket	2.50 + .28 per ft.
16S-16S	16 pin socket to socket	2.75 + .32 per ft.
20S-20S	20 pin socket to socket	2.85 + .40 per ft.
26S-26S	26 pin socket to socket	3.50 + .52 per ft.
34S-34S	34 pin socket to socket	4.10 + .68 per ft.
40S-40S	40 pin socket to socket	4.50 + .80 per ft.
50S-50S	50 pin socket to socket	6.15 + 1.00 per ft.
60S-60S	60 pin socket to socket	6.65 + 1.20 per ft.



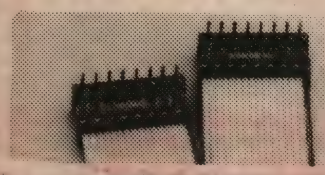
IDS SOCKET TO IDE EDGECARD

PART #	DESCRIPTION	PRICE
10S-10E	10 pin socket to edg.crd.	3.20 + .20 per ft.
14S-14E	14 pin socket to edg.crd.	3.50 + .28 per ft.
20S-20E	20 pin socket to edg.crd.	3.75 + .40 per ft.
26S-26E	26 pin socket to edg.crd.	4.75 + .52 per ft.
34S-34E	34 pin socket to edg.crd.	5.40 + .68 per ft.
40S-40E	40 pin socket to edg.crd.	6.45 + .80 per ft.
50S-50E	50 pin socket to edg.crd.	7.85 + 1.00 per ft.



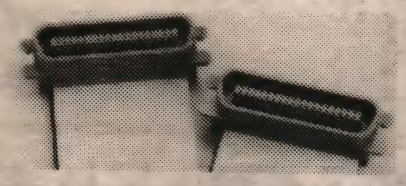
IDE EDGECARD TO IDE EDGECARD

PART #	DESCRIPTION	PRICE
10E-10E	10 pin edg.crd. to edg.crd.	3.80 + .20 per ft.
14E-14E	14 pin edg.crd. to edg.crd.	4.00 + .28 per ft.
20E-20E	20 pin edg.crd. to edg.crd.	4.50 + .40 per ft.
26E-26E	26 pin edg.crd. to edg.crd.	5.30 + .52 per ft.
34E-34E	34 pin edg.crd. to edg.crd.	5.90 + .68 per ft.
40E-40E	40 pin edg.crd. to edg.crd.	7.00 + .80 per ft.
50E-50E	50 pin edg.crd. to edg.crd.	8.50 + 1.00 per ft.



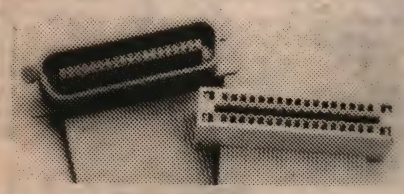
IDD DIP PLUG TO IDD DIP PLUG

PART #	DESCRIPTION	PRICE
14D-14D	14 pin dip plug cable	2.60 + .20 per ft.
16D-16D	16 pin dip plug cable	2.75 + .32 per ft.
24D-24DE	24 pin dip plug cable	3.75 + .48 per ft.
40D-40D	40 pin dip plug cable	7.50 + .80 per ft.



57 SERIES RIBBON CABLE ASSEMBLIES

PART #	DESCRIPTION	PRICE
5724P-P	24 pin male to male	10.00 + .48 per ft.
5724P-S	24 pin male to female	10.50 + .48 per ft.
5724S-S	24 pin female to female	11.00 + .48 per ft.
5736P-P	36 pin male to male	8.00 + .72 per ft.
5736P-S	36 pin male to female	10.00 + .72 per ft.
5736S-S	36 pin female to female	12.00 + .72 per ft.
5750P-P	50 pin male to male	16.75 + 1.00 per ft.
5750P-S	50 pin male to female	16.25 + 1.00 per ft.
5750S-S	50 pin female to female	15.75 + 1.00 per ft.



RADIO SHACK PARALLEL PRINTER CABLE

PART #	DESCRIPTION	PRICE
36P-34E	36 pin male to 34 pin edg.crd.	8.50+.68 per ft.



IBM CABLE ASSEMBLIES

PART #	DESCRIPTION	PRICE/QTY 1-9	10-24	25-49
PPC301-6	6 ft. parallel printer cable	10.40	9.45	8.67
PPC301-10	10 ft. parallel printer cable	12.00	10.91	10.00
ATSC-10	10 ft. AT serial printer cable	19.90	18.09	16.58
MEC-10	10 ft. monitor extention cable	3.75	3.00	2.73
KEC-10	10 ft. keyboard extention cable	3.63	2.90	2.64

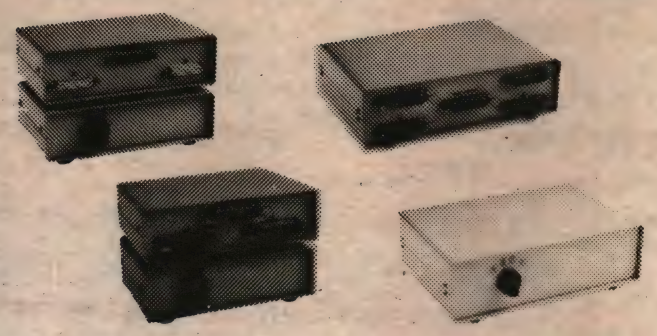
HARD DRIVE CABLE ASSEMBLIES

PART #	DESCRIPTION	1-9	10-24	25-49
HDC-22	22" hard drive cable assy.	8.50	7.73	7.08

MISC. CABLE ASSEMBLIES

PART #	DESCRIPTION	PRICE/QTY 1-9	10-24	25-49
CC1	Atari cable, 13 pin male to female	11.88	9.50	8.64
CC2	Atari int. to parallel printer	13.13	10.50	9.55
CC4	5 pin din to 4 RCA plugs	3.60	2.88	2.62
CC8	6 pin din male to male	3.50	2.80	2.55
CC11	RGB monitor cable	9.13	7.30	6.64
JYA	joystick "Y" adapter	4.00	3.20	2.91

DATA TRANSFER SWITCHES

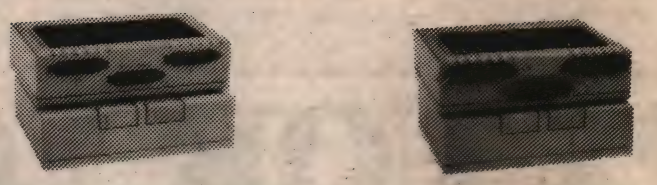


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AB25-4	4 port serial	95.00	AB36-5	5 port parallel	145.00
AB25-5	5 port serial	115.00	AB25-X	serial crossover switchbox	87.50
AB36-2	2 port parallel	92.50	AB36-X	parallel crossover switchbox	117.50

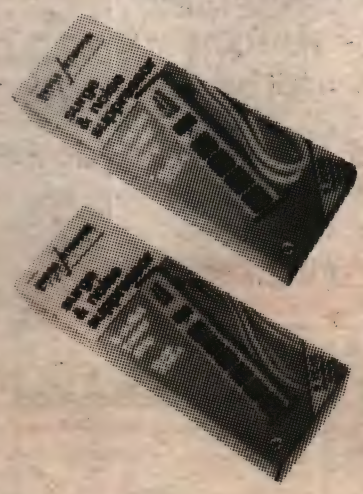
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PART #	DESCRIPTION	PRICE	PART #	DESCRIPTION	PRICE
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Lotus 1-2-3 Made Easy

Mystified by Lotus 1-2-3? For would-be users of business's most popular software comes sympathetic help in unraveling the sometimes elusive program.

Getting Started With Lotus: Creating Spreadsheets, Graphs, and Charts, recently published by the MIT Sea Grant Program, developed out of Sea Grant Administrative Officer Larry McKinnon's experience with the spreadsheet software. "I had trouble interpreting existing manuals, especially in creating graphs, writing formulas, and manipulating data," McKinnon said. "Especially graphs," he emphasized. The manual "represents hours of experiments and long conversations with Lotus support personnel." Over a period of a year McKinnon kept detailed notes on his problems and solutions, which he now finds invaluable in his work.

When McKinnon discovered that co-workers and other Lotus users were having similar problems applying the software, he decided to publish his notes.

The result is a set of clear, step by step instructions for creating spreadsheets, writing and using formulas in spreadsheets, and creating line graphs, bar graphs and pie charts using Lotus on an IBM PC XT hard disk system. McKinnon and Sea Grant editor Lynne Newman Lawson also describe how to sort data in a spreadsheet and how to generate mailing labels from an address list.

Simple introductory exercises and plentiful examples enhanced with a straightforward graphic design make this manual easy to use for the newly-enlisted, but the book also contains helpful hints for the more experienced veteran.

The 59-page manual is available for $10.00 from the MIT Sea Grant Program, MIT Bldg. E38-302, 292 Main Street, Kendall Square, Cambridge, MA 02139. Telephone (617) 253-7041.

Mention that you read about it in *Computer Shopper*. ●

Multiplan Version 2
continued from page 84

that some commands required use of the tab key to enter row and column numbers separately, something that took a while to get used to.

I've heard that the new Multiplan supports some of the new technology in terms of faster chips, such as the 8087. Not having any of these, I could not test for this, nor test whether MP "breaks the 640K memory barrier" for spreadsheets. The literature shows nice support of color and graphics, as well as of Microsoft's Mouse.

Multiplan comes with a nice tutorial in the manual itself. A beginner can work his way through the examples and learn by doing. Those who have some spreadsheet experience will find most of the routine aspects of data entry to be familiar, except for the small points I've noted above, such as the command menu always being active.

MP solves the problem of ranges and relative numbers by converting to a format which appears relative more than on other spreadsheets. However, this means that certain commands must be entered in that fashion. I had a little trouble learning how to copy ranges, but this was because of my familiarity with other spreadsheets, not so much because Multiplan has a particular problem.

As with any decent spreadsheet, MP allows you to print output. I settled for a plain-Jane printout of my amortization schedule. I did not try any graphics since I was not sure I had properly installed printer drivers.

Multiplan comes ready to run as is, for a PC, but I took no chances and reinstalled it for my Tandy 1000. In that configuration, it would not run on the semi-compatible Sanyo 550/555 computers, with the dreaded "Interrupt Trap Halt" error being the problem. I did not investigate whether another configuration or installation attempt would allow this to be otherwise, for this error is usually the kiss of incompatibility for that machine. Perhaps some reader with a 550 or 555 can advise me if he or she has gotten Multiplan to work on that computer.

MP permits cells being given names, such as "Profit;" this is particularly useful with macros. However, I did not figure out how to "unname," at review time.

Summary

Microsoft has implemented most or all of the desired features of present generation spreadsheets in Multiplan Version 2. It frequently implements things differently than other spreadsheets--just as word processors with similar features have different means to activate them. I recognize that the tools available rival those of the more expensive competitors such as SuperCalc 3 and Lotus 1-2-3. In almost all cases, there are tradeoffs in terms of relative advantages and disadvantages. If you are highly experienced in using 1-2-3, you might not want to switch, despite the $300 lower price tag.

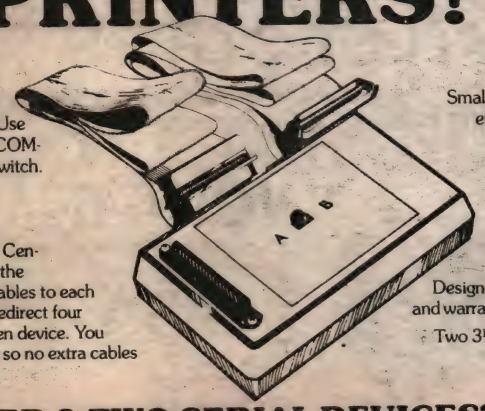
But, if you're cost-conscious and not too highly "indoctrinated" by a competitive product, Multiplan, with its lower price coupled with all its features, its lack of copy protection offers users some peace of mind, too. And if you're not overly concerned about some of the smaller points and quibbles I've raised here, then Multiplan is a viable option which must be considered, especially in view of the low price ($195 list) for such power.

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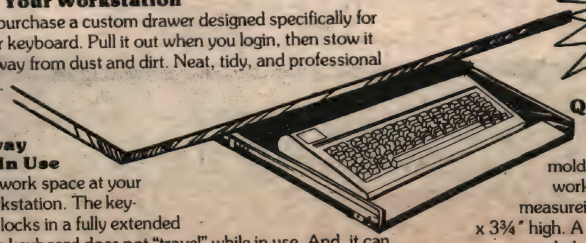
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Periscope continued from page 76

System Requirements

PERISCOPE requires an IBM PC,XT,AT or compatible with at least 128K of RAM,one disk drive and an 80 column monitor. Furthermore, you must be operating under DOS 2.0 or greater. PERISCOPE will support two monitor systems, sending the normal screen data to the first monitor and the data to the other.

Assemble Code

There are times that you may want to test a small portion of code to see if it executes properly. This is particulary true if you were trying to test ROM BIOS or DOS function calls. PERISCOPE contains a 'micro assembler' that permits you to interactively write code using assembly mneumonics and assemble it. An additional feature of PERISCOPE is that you may obtain an immediate display showing the hex code for the compiled instructions. The assembly mneumonics are created using the 'COM' file format which means that you may write small COM files using only the debugger. The only restrictions most need to concern themselves with is that PERISCOPE will not calculate offsets automatically, it will not accept labels (such as 'jmpnext') and is lacking one important (and often used) opcode, the define byte command ('DB'). Also, you must manually enter the size of the program inorder to save it to disk.

Unassemble Commands

PERISCOPE supports two forms of program dissassembly, the Unassemble and the display. The unassemble command is used to look at program code in its mneumonic format. For instance, an interrupt 21 request would be displayed showing the program segment, the instruction offset, the hex code for the instruction and finally the mneumonic 'INT 21.'

The display command (or dump as many of us affectionately call it) may take several formats, depending upon what you are looking at. The formats supported by PERISCOPE include: display ascii, display byte, display doubleword, display effective address, display unsigned integer, display signed integer, and display word.

The dumps mentioned above all work on the same data found in memory, the only difference is in the way it interprets the data. Many debuggers lack this versatility.

One interesting feature of PERISCOPE is its ability to read a segment of memory, like the program segment prefix (PSP), and display several types of information (ascii, words, integers, etc.) simultaneously. This feature is present using a form of batch files referred to as 'DEF' files. These files are created with a standard text editor and are easy to modify or create.

Search for Code

If you often look throughout programs trying to find byte patterns, you'll appreciate the fact that PERISCOPE offers three different ways to search through memory for information.

The first search consists of looking for a byte or string pattern. This works much the same as other debuggers or even text editors; you tell PERISCOPE what to look for and tell it where to look. Any matches to the pattern result in the segment and offset being displayed on the screen.

The second search available is particularly neat - it allows you to search forany code that references a particular memory location.

Finally, the third trace allows you to search based on disassembled strings matching. For example, you could search for"INT 21"instead of CD 21. This is particularly useful in looking for jumps, compares and other commands for which the actual hex code may not be known.

Modify Code

Once you find an area of code that you want to change, you have several options. You may merely enter the data, effectively overwriting the existing information or you may choose to enter the new code in its mneumonic form, using PERISCOPE to compile the commands as they are entered.

Another method available to the programmer is to move blocks of memory around in the program. Not only does PERISCOPE support memory moves, but the moves may be either up or down. Other debuggers generally limit you to one direction, usually up.

Trace Program Execution

PERISCOPE offers the programmer three types of program tracing, the standard-trace, the backward trace (my next topic) and a normal unassemble. One feature present on PERISCOPE is its ability to continue tracing right through interrupts.

Unlike DEBUG, this program will enable you to trace, step by step, completely through DOS interrupts. This is particularly nice if you are trying to workout compatibility problems when DOS updates are made as well as when you are debugging device drivers.

Traceback Option

When you step through a program using several options, PERISCOPE automatically stores the previous instruction into a memory buffer set up during installation. The effective buffer may be configured to store up to approximately 2000 previous instructions. This option is especially useful in determining how you got to a particular point in a program.

Unlike the hardware debuggers, making use of this feature does result in a significant slow down in program execution speed. When you need this feature, however, you are more than willing to pay the penalty of time for the effort it saves.

Code Breakpoints

I wanted to save the best for last. PERISCOPE provides 10 different types of breakpoints! This means that there are ten different types of conditions the program will monitor and should one of those conditions be met, PERISCOPE will cause the program to stop and

continued on page 90

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Periscope continued from page 89

return control back to the debugger.

Breakpoints may be set using standard code breakpoints (stop when a memory address is accessed), breakpoint on issuance of an interrupt request, break when memory range is read or written, break when a port is accessed, break on word values, break on used defined break points and break on register values.

When breaking with several of the above options, logical operations can be carried out. For instance, you could specify a code breakpoint to occur anytime the AX register contains a value greater than 0CA3.

It is these breakpoints options that sets PERISCOPE out from its peers. But there is a penalty for using these breakpoints - program execution is dramatically slowed. This is the one advantage hardware debuggers have over the software-only counterparts.

Regardless of the slowdown, the breakpoint options in PERISCOPE make the program especially suited for tracking down problems in programs for which the source code is unavailable.

Terms and Warranty

Periscope is sold with a 30 day money back guarantee. This means that if you don't like what you've bought, you can return it for a full refund. The price of the Periscope I package, which includes a manual, reference card, software disk, the breakout switch and the 'Submarine' memory board is $295.

The Periscope II package, which includes a manual, reference card, software disk and breakout switch is $145. Data Base Decisions does offer a very reasonable upgrade policy whereby those wishing to upgrade to a Periscope I pays the difference in price plus $20 for service. In other words, $170 isall it takes to upgrade from Periscope II (without the Submarine board) to Periscope I.

The breakout switch and memory board carry a one year warranty.

Site licenses and quantity discounts are available directly from Data Base Decisions on a custom basis.

Conclusion

If you don't regularly use debuggers, you would probably find DEBUG to be adequate for merely inspecting a program. Lacking a great number of PERISCOPE'S capabilities, DEBUG does accompany PC-DOS (which basically means it's free!) and provides you with a minimal number of commands.

If you outgrow something like DEBUG, your next logical move up would be to a symbolic debugger like SYMDEB. This debugger accompanies the MicroSoft Macro Assembler.

SYMDEB gives you the power of symbolic debugging (uses your original public declared labels instead of branch addresses) along with a few additional commands not found in DEBUG. SYMDEB offers memory compare functions, multiple program breakpoints, stack tracing, etc.

Then comes PERISCOPE, which incorporates all of the previous features found in both DEBUG and SYMDEB along with a host of additional features, the most important of which is multiple screen support (one screen shows the actual program executing while the other is used for the trace), far better search and find routines, a superior set of breakpoint operations and a traceback feature.

The biggest advantage I found in PERISCOPE was the breakout switch and the protected memory board. The breakout switch permits you to exit an executing program immediately by utilizing the non-maskable interrupt (NMI). The protected memory, found only on the Periscope I package, provides additional protection against a program overwriting your debugger by providing 8K of RAM addressable via port addresses.

Other advantages PERISCOPE has over other software debuggers is its compatibility with the EGA (Enhanced Graphics Adapter) and 80286 real modeopcodes. The current version of PERISCOPE, 2.01, will not work with the protected mode of the 80286.

There are a few drawbacks to PERISCOPE, though. To begin with, I was unable to use PERISCOPE with the Paradise Modular Graphics Adapter since it did something to the NMI which conflicted with PERISCOPE. Also, when using the assembler, the "DB" command is not implemented, leaving you to your own resources to enter long strings into a program.

Realizing that only one out of a hundred programmers every require this level of debugging sophistication, it is hard to believe that even PERISCOPE is dwarfed by the power of the true hardware debugger boards. The Rolls Royce of the hardware debuggers is Atron, and next month we'll look at their $1600 PC Probe debugger board.

Unless you are a commercial software engineer, the cost of hardware debuggers is too prohibitive. While the PERISCOPE can't compete with these units, the PERISCOPE represents the finest software debugger available in its class.

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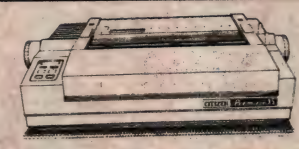
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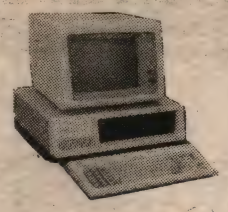
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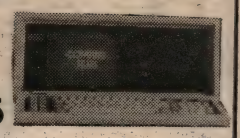
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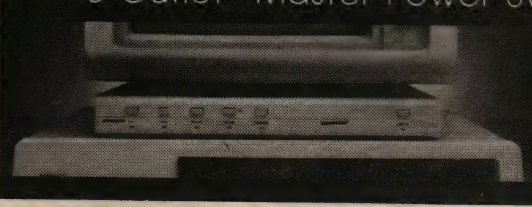
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SUPER I/O Board And The PC Accelerator Software

by Bill McMurran

The STB SUPER I/O board (from STB Systems) is a multifunction board intended for IBM PCs, XTs, and most compatibles. It is a short board that will fit the XT's short slots but it may be used in any expansion slot.

The SUPER I/O board comes with a single RS-232-C serial port, a parallel port (printer or SASI disk controller), a battery clock/calendar and a game paddle/joystick port. There is no provision for additional memory, which makes this board a candidate for those computers which have 640 k on the system board or for those which need extra serial/parallel/game ports.

Installation was simple. Complete, easy to understand, instructions are provided and no problems were encountered.

One unique feature of the board is that the parallel port can be used as a true bi-directional port by turning SW1-5 "ON." This allows the data-output drivers of the port to be turned off whenever the /ACK line (pin 19) is active (LOW). Also the port includes an "acknowledge" strobe on pin 26. This strobe is set or driven LOW whenever the data port is written or read. The strobe is driven HIGH or reset whenever the BUSY signal on pin 21 is driven LOW. These attributes allow the parallel port to be used as interface to a SASI (Shugart Associates Standard Interface) compatible hard disk controller. Other switch settings allow the Parallel port to be configured as LPT1, LPT2, or LPT3. The serial port can be configured as either COM1 or COM2. These are very useful features for expansion boards.

The game port will allow up to four paddles or two joysticks to be connected to the computer. The game port will interface directly with Apple computer plug-compatible devices, or through an adapter cable (furnished) to IBM plug-compatible devices. The game port can be disabled if desired.

The STB clock/calendar is powered by a standard alkaline AA (penlight) size battery which can be mounted with double sided tape on either the inside or outside of the computer. My preference is on the outside as this mounting allows the battery to be changed without opening up the computer and should battery leakage occur, keeps it away from the sensitive electronic components.

I did not try out the SASI interface as I do not have the necessary hardware to interface with it but all other interfaces worked without any problems.

The PC Accelerator (PCA) Version 3.0 software which is distributed with the Super I/O board is simply excellent! Resicorp has done a fine job of producing a PC enhancer which does its job in an unassuming, straight forward manner. It addresses the two slowest parts of PC operation, namely Printing and Disk I/O. The PCA combines print buffering and RAM disks in one piece of software. Well, what's new about that? Doesn't nearly every multifunction card do

continued on page 94

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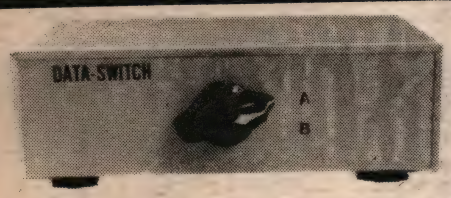
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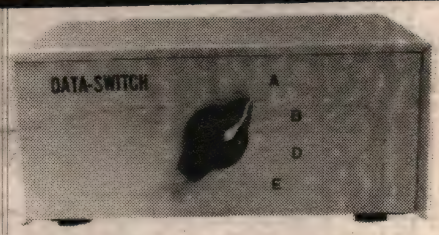


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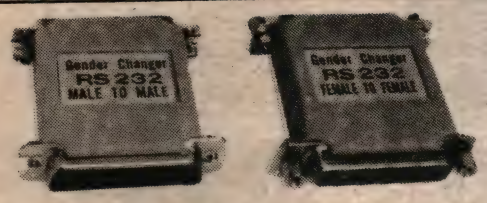
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Paradox Developer Support Program Applications

Ansa Software has announced the Paradox Developer Support Program, a package of services that helps programmers create and distribute applications based on the Paradox database program. Included in the package are an abridged version of Paradox called Paradox Runtime, technical phone support, a newsletter, technical notes and a developers' tool kit.

Registered Paradox owners can obtain Paradox Runtime this April for a nominal handling fee. They may then make as many as 250 copies of the unprotected software for distribution to customers or other users.

Steve Dow, president and chief executive officer of Ansa Software, said, "We are committed to supporting the development community by offering tools such as Paradox Runtime and the other components of the Paradox Developer Support Program. Since the beginning, we have worked closely with developers to define Paradox, the PAL programming language and Paradox Runtime. Developers are important to us and crucial to the success of Paradox."

Paradox is a relational database management program that runs on the IBM family of microcomputers and 100 percent compatibles. Paradox serves the full range of user application needs — from the first-time user to the sophisticated database developer. Included among its features are a familiar 1-2-3-like interface and a powerful programming language.

Many developers create application-specific programs, such as order entry and sales analysis, for use in other businesses. Developers can create such applications using the full Paradox program. In use, however, many of these applications require only a subset of the functions of Paradox and can be run under Paradox Runtime. Paradox Runtime gives developers a cost-effective way to distribute such applications to their customers.

Registered Paradox users will be notified by mail in April as to how they can obtain Paradox Runtime and an instruction manual. A fee of $9.95 covers all shipping and handling.

Subscribers to the program will have access to a toll-free telephone number to ask questions of Ansa support technicians familiar with the database's programming language and Paradox Runtime.

Participants will receive "PAL Tech," Ansa's quarterly newsletter that will contain programming tips, PAL utilities, example programs, announcements of additional support services and other items of interest to developers. They will also receive occasional technical notes and the Paradox Developer's Tool Kit.

The tool kit comprises a number of utility programs written in PAL, including a data dictionary, an automatic menu generator, a program that recovers damaged files and a number of subroutines written in C that can read and write Paradox files.

continued on page 94

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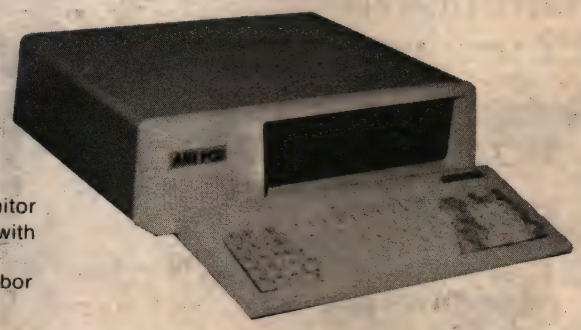
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All-In-One Client Accounting System Announced by Pyramid

PARAGON - Client Accounting is a software package that gives the accountant complete Client Accounting abilities while allowing him to also provide functions such as Accounts Payable, Accounts Receivable, Payroll, and Inventory to his clients.

PARAGON - Client Accounting operates on any IBM PC, XT, AT, or compatible, and requires 256K of memory, and a minimum of a 10MB hard disk. Since the system operates in conjunction with PARAGON - Accounting For Everyone, users must also purchase PARAGON - Accounting For Everyone to operate the system. PARAGON - Client Accounting has a suggested retail price of $49.95, PARAGON - Accounting For Everyone is available for $995.00.

PARAGON - Client Accounting provides a complete After-the-fact Payroll entry screen which allows input of up to 16 different earnings categories and 18 deductions categories. The system will check for the limit on such taxes as FICA and SDI, and alert the CPA when an employee has exceeded any limit. The After-the-fact Payroll, as well as the live Payroll will operate in all 50 states and the provinces of Canada.

Custom financial statements gives the CPA the ability to generate financial statements that fit each of his client's needs. "Instead of being confined to cumbersome reporting formats, PARAGON - Client Accounting allows the CPA to design a custom financial statement for each of his clients," said Don Cantral, vice president of marketing. The system allows for up to 999 pages in each financial statement.

The accountant is also looking for a great deal of flexibility in the Chart of Accounts. PARAGON - Client Accounting allows a virtually unlimited number of accounts and a user defined account numbering system. Additionally, the system accommodates up to 9,999 corporations, each with 9,999 departments, each with 9,999 accounts, and each account having up to 9,999 subaccounts per client. An unlimited number of clients can be tracked by the system.

As their clients' needs expand, the CPA can offer them such services as Accounts Payable, Accounts Receivable, Payroll, Inventory, and Job Cost without any additional investment in time or money. "PARAGON - Client Accounting was designed to answer as many of the CPA's needs as possible, both present and future," according to Trish Isén, director of technical services.

Mention that you read about it in *Computer Shopper*. ●

Super I/O
continued from page 92

about the same thing? Yes and No. PCA is software that just won't quit! Just look at these features:

Print Buffers - Up to three printers, buffer-size limited only by available RAM memory.

RAM Disks - Up to ten (10) RAM disks at once. Size limited only by available RAM memory.

Extended Memory Support - PCA will utilize the IBM PC/AT extended memory (above 1 megabyte) for the print buffers and RAM disks.

Expanded Memory Support - PCA can use the expanded memory on STB's Memory Companion/PC for print buffers and ram disks.

Date and Time - When used with STB expansion boards that have the battery clock option installed the system time and date will be set automatically at each time of system turn on.

Keyboard Commands - PCA allows the user to pause the printer, clear the print buffer, reset the printer, initiate form feeds, and swap printers from the keyboard. Remember, it will support and control up to three printers.

Warm System Reset - This option will provide a warm reboot without losing the contents of RAM disks or print buffers. The Ctrl, Alt, and Del keys perform this function and if you really want to clear the RAM disks and print buffers then you use the Ctrl, Alt, and Ins keys.

Quick Start Option - PC and PC compatibles which use memory size switches on the system board can take advantage of this feature. System board switches are set to a low value of memory, typically 64k, which will reduce start up time and then PCA will corral the rest of the available memory and put it to use.

PC Utility Program - by entering the command "PCU"

continued on page 99

Paradox Developers
continued from page 93

The cost of the package of services (excluding Runtime) is an annual fee of $250.

Ansa Software, located in Belmont, Calif., develops and applies advanced software technology to create mainstream software products that increase the productivity of users while reducing their efforts. Ansa was started by two senior computer scientists from SRI International and funded by the venture capital firms Sevin Rosen Management Co., and Kleiner Perkins Caufield and Byers.

Mention that you read about it in *Computer Shopper*. ●

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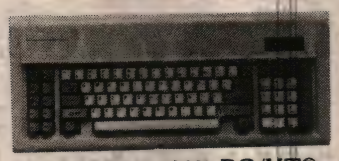
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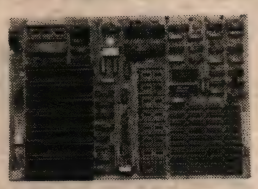
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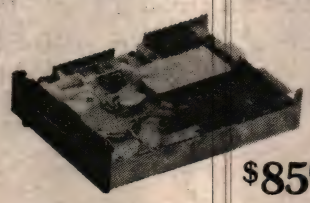
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41256	256KX1	(100ns) $4.85 (120ns) $3.35 (150ns) $2.75	
4464	64KX4	(150ns) $5.50	11.00
4164	64KX1	(120ns) $1.40 (150ns) $1.30 (200ns) $1.20	11.20 10.4 9.6
4416	16KX4	(150ns) $Call	

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LP-3 (150ns) $1.75

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APL-3 (300ns) $2.25

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8031A	$5.75	8155-2	$5.95	8251A	$3.50	8284A	$3.95
80C35	$5.95	8155	$3.25	8253-5	$3.25	8286	$4.95
8035	$2.75	8156-2	$6.95	82C53-5	$5.95	8287	$4.95
80C39	$4.50	8212	$1.60	8255A-5	$3.25	8288	$6.25
8039	$3.75	8214	$2.95	82C55A-5	$5.95	8289	$19.00
8080A	$2.95	8216	$1.60	8257-5	$3.25	8741A	$12.25
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LS09	.15	LS138	.35	LS258	.50
LS10	.15	LS139	.35	LS259	1.00
LS11	.15	LS145	.75	LS260	.40
LS12	.25	LS151	.35	LS266	.30
LS13	.30	LS153	.35	LS273	.75
LS14	.30	LS154	.85	LS279	.30
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LS32	.24	LS161	.40	LS299	1.50
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LS85	.45	LS192	.70	LS378	.80
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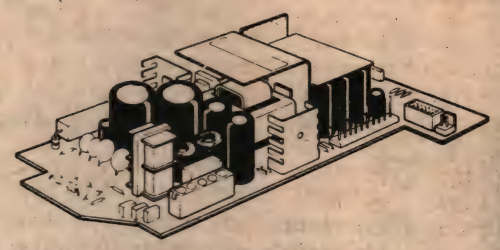
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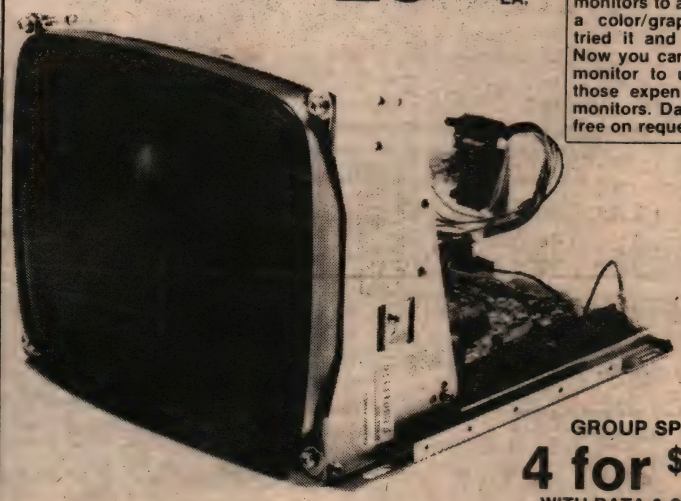
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The board sets we are offering are NOT complete blood analysis systems and are sold only for the speech synthesis circuitry they contain. A powerful motorola 68705 U3L single chip processor controlled the blood analysis unit. This processor also interfaces to the General Instruments two chip speech set which includes a SPO256-AL2 (28 pins) and a SPROOO (40 pins).

The GI SPO256 contains 59 addressable allophones and 5 pauses which may be strung together to produce any English word. The SPROOO allows expansion to the external EPROM (27128) for storage of the desired vocabulary. The SPO256 also has a vocal tract model, 16K ROM, ALU, handshake control, pulse width modulator, 12 holding registers, and 5 interpolation registers all in one 28 pin package! This high density chip design allows for a complete voice system that requires only a few parts to be complete.

By adding only one resistor, the units can be put into a "Test" mode to demonstrate the internal vocabulary. This board set has been selling like crazy at surplus stores in both Dallas and Houston. We have, however, set aside a limited number of these boards for sale to our special mail order customers. One resourceful customer in Houston even had one of these "Talkers" connected to his personal computer doing random speech!

These devices were powered by a regulated 9VDC 1 Amp power supply. We have luckily acquired a FEW of the supplies, and are selling them for $6.95 each when purchased WITH the Talkers. The DC supply is a totally self contained affair that is rated for only 10 mv ripple at the output. DC supply when purchased separately is $12.95.

We are also offering the GI set separately (new, unused parts) for $9.95. Remember: this is for BOTH chips. Radio Shack sells the SPO256 alone for $12.95!! Our stock on the new chip pairs is limited, please order early to avoid being left out. Sure. the completed Talker units are a better deal, but you still might want to purchase an extra chip set for a spare.

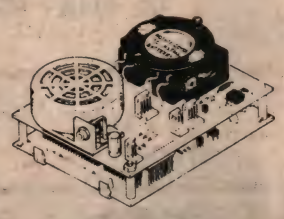
For the real hardware hackers we have a few of the blank PC board sets to the Talkers for $4 (both boards).

We include full schematics of the Talkers, GI speech chip set data, and "Test" instructions, with every shipment. Note: issue #29 of Analog Computing (P.O. Box 615 Holmes, PA 19043) has a very detailed article on using the SPO256 with a personal computer.

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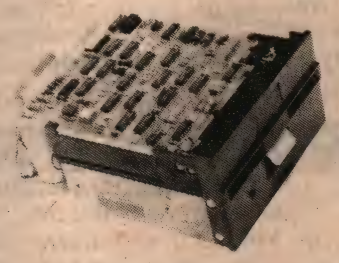
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Inside Commodore continued from page 53

unusual Commodore graphics characters, that are often part of a BASIC listing (reverse hearts, etc.), to a readable format that will print out on any printer, including a daisy-wheel. This makes it possible to list otherwise undecipherable Commodore BASIC programs.

5) A "hex dump" mode to examine the exact hex values that are being output to your printer. This feature is useful in diagnosing software and printer incompatibility problems. Even if your printer does not already have a built-in hex dump feature, this mode will work.

The various operating modes have been designed to be software compatible with the popular "CardCo" (tm) serial bus interfaces. This compatibility makes it possible for the interface to work with a lot of software designed for the "CardCo" interfaces specifically.

An advanced version of the program (code named "Buffy"), is also in the works, that includes these extra features:

6) Installation menu built-in to the boot program. This allows you to make custom modifications to the printer driver to configure it for your software or printer. You can permanently enable or disable the conversion features. You can also specify printer initialization strings. The customized version of the printer driver can then be saved to disk.

7) Compatible with "SpeedScript 3.0." A version of the printer driver will be provided that will work with *COMPUTE!*'s famous word processing program.

continued on page 100

Super I/O continued from page 94

at the DOS prompt PCU will display the status of the amount of memory available to DOS and the size of the various RAM disks and printer buffers you may have set up. If you enter"PCU P = x" where x is a number from 0 to 9 you will alter the printer priority. 0 is the lowest and 9 the highest priority with the default being 5. By giving the printer a lower priority, programs that, normally might suffer interference from printing will be able to run concurrently with the printer.

I tried this out by setting the printer priority to 0 then loading a fairly long file into a 32k spooler that had been set up under PCA and printing it. While the printer was running I called several bulletin boards, signed on, and downloaded some files at 1200 baud. The downloads were without any problems and the printer continued to chug away, albeit a bit slower.

To summarize my impressions, the software (PC-Accelerator) performed exactly as claimed, the installation was a pleasure and a model of what menu driven installation programs should be. The only nit I found was that when I typed in PCA at the DOS prompt instead of the intended PCU, the system locked up. This should be corrected as it mars an otherwise superb software implementation.

I talked with STB and learned that the PCA program is available separately and lists for $79.95. I was also told that it would work with other memory boards as well as the STB line. I did not have the hardware to verify this but it worked very well with the non-STB memory that I had available (256 K on the system board). The STB SUPER I/O board lists for $249.00 and the PCA is bundled with it.

STB's MEMORY COMPANION/PC mentioned above is a pure memory expansion board built to the LOTUS/INTEL spec.and will support up to 2 megabytes of memory. It lists for $355.00 with zero K. ●

Ashton-Tate Ships dBASE III PLUS LAN PACK

Ashton-Tate announced that it has begun shipping dBASE III PLUS LAN Pack, which enables multiple users to share dBASE III PLUS on a local area network.

dBASE III PLUS LAN Pack is a companion product to dBASE III PLUS, Ashton-Tate's new database management software product that combines both stand-alone and multi-user capability in a single package. Initial shipments of dBASE III PLUS LAN Pack to distributors and retail chains began January 24.

Each dBASE III PLUS LAN Pack consists of three dBASE Access programs, which provide three additional users with economical network-only access to dBASE III PLUS. Each dBASE Access program connects to the dBASE III PLUS. Each dBASE Access program connects to the dBASE Administrator included in the dBASE III PLUS package. The dBASE Administrator, when installed on the network server, is a shared database manager, providing true multi-user access to data files while preventing simultaneous access to the same record (record locking) or file (file locking).

dBASE III PLUS can be used as a powerful stand-alone product until the desire to network arises. It can then be linked on a network to other copies of dBASE III PLUS or to dBASE Access programs from dBASE III PLUS LAN Pack. A four-user network created by one dBASE III PLUS LAN Pack and one dBASE III PLUS costs less than $425 per node.

The suggested retail price of dBASE III PLUS LAN Pack is $995 and includes three dBASE Access keys and three full sets of dBASE III PLUS documentation. dBASE III PLUS began shipments on December 30, 1985.

For additional information contact Ashton-Tate, 20101 Hamilton Avenue, Torrance, CA 90502-1319; (213) 329-8000.

Mention that you read about it in the *Computer Shopper*. ●

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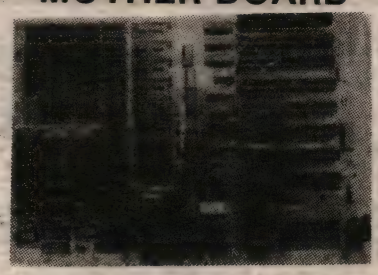
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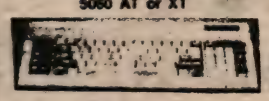
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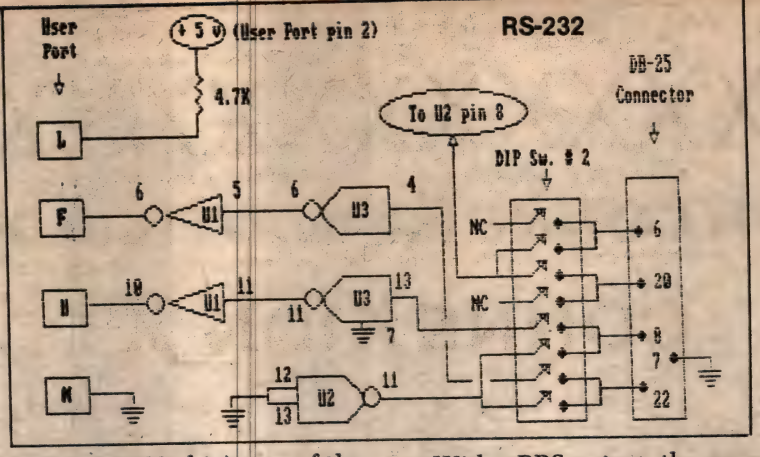
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You can continue to program in BASIC or run programs in the foreground.

RS-232 Hardware Project Update

Last month's User Port to RS-232 project is just now beginning to be built by some of our readers. One thing has come up about the interface. Some people want to be able to have both the DCD (carrier detect) and RI (ring indicator) lines available as inputs at the same time. This is primarily for people who are running BBS systems and need to know when: (1) the phone is ringing for auto-answer modems and (2) when carrier detect falls so they know the caller has hung up. A very slight modification to the DIP switch wiring allows for this. I have included a new partial schematic that shows this wiring. (Refer to Figure 1)

Because we have limited ourself to four input lines at once (unless we want to add another 1489 chip), one of the other RS-232 input lines from the interface has to be changed. I have done this by making DSR (data set ready) high all the time. This line is almost superflous,



With a BBS system, the modem is normally going to be on all the time anyway. If it isn't, you sure don't have to worry about RI or DCD either. You shouldn't have any problems with leaving DSR high all the time, but just remember to keep your modem turned on, when you want to talk to it.

If you are wondering what on earth, DSR, RI, and DCD are...that just happens to be my next subject!

The RS-232 Interface: A Common Point of Confusion

Last month, you saw how to put a "standard" RS-232 port on the VIC-20, C-64, or C-128. Now, let's go back and look at RS-232 in more detail. This should help those of you who are struggling to understand this interface.

Some Good Reference Material

If you've worked with the Commodore implementation of RS-232, you have probably read the RS-232 sections in the *C-64 Programmer's Guides* (PRG). The "PRGs" do a fair job of describing the programming syntax needed to operate the RS-232 channel from BASIC or assembly language. But, they don't do a adequate job (in my opinion) of describing the hardware interface.

They assume that you are already familiar with RS-232 and the cryptic references to things like "DTE," "DCE," "RTS," or "CTS." After reading this article, you should have a better understanding of those acronyms stand for.

Explaining the RS-232 standard easily takes a book in itself. If you are in need for more in-depth information, I suggest you get a copy of *The RS-232 Solution* by Joe Campbell (Sybex Books: 1984).

The RS-232 Interface in General

The "RS-232" interface is an industry standard method of serial data transfer. Serial transfer complicates things. Unlike parallel transfers, you have to move data bits around in shift registers to form a byte that the computer can use when both sending and receiving data. This makes serial slower than parallel transfer.

But, the serial approach also makes it possible to have a bi-directional data channel with as little as three lines. This allows you to send data over ordinary communication channels, like phone lines. This was the primary reason serial transfer was developed.

We aren't going to consider the technical details of bit shifting, protocols, and how serial data transfer is accomplished, this month. Instead, I want to concentrate on the other aspects of the RS-232 interface, especially the data, hardware

continued on page 102

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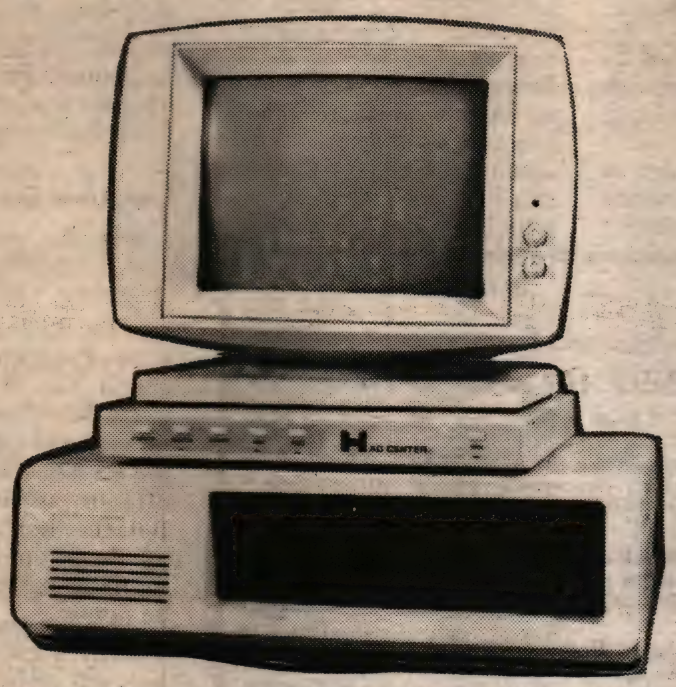
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Inside Commodore continued from page 100

handshake, and status lines that are often confusing.

Defining Some Terms

A very important concept to keep in mind about the RS-232 interface, is that the interface was originally designed as a means of connecting a terminal (teletype) and a modem. It has since been used as a method of connecting *all* types of electronic equipment together but that was not its original intention. Two important principles about all RS-232 interfacing are based on this fact.

Data Terminals and Data Sets: Terminal (DTE) and Modem (DCE)

One principle of RS-232 is: "Only two devices may be connected to each other on an RS-232 interface." RS-232 is not a "bus" type interface, where multiple devices can co-exist (unlike the Commodore disk serial bus). Only two devices can be connected to each other at once. (Mechanical and electronic switching devices may allow multiple RS-232 interfaces to be connected to each other physically, but, electronically, only two devices can be active at any one time.)

The other principle is, "Of the two devices connected to each other, one must act like a terminal, and the other must act like a modem." This means that if two devices both want to act like a terminal, it won't work. Likewise, if both want to be a modem.

In RS-232 terms, devices configured as a terminal are called Data Terminal Equipment (DTE), and devices configured as a modem are called Data Communication Equipment (DCE). The DCE device is also sometimes referred to as the "Data Set." For the rest of this article, I will refer to the "terminal-configured" device as the DTE and the "modem-configured" device as the DCE, interchangably (even though the DCE may actually be another computer or a printer).

Commodore computers, like most computers, are normally configured as terminal (DTE) devices. Obviously, since a computer can be programmed to act like a terminal (using a terminal program), it's possible to use the RS-232 interface to connect a computer and a modem without much trouble.

But, in order connect two computers together (or a computer and printer), one of them has to be configured to look like a modem, even though it's not. That takes a little trickery as we'll see later.

Hardware Components

In order to standardize the RS-232 interface, manufacturers have agreed on voltage levels, pin designations, and connectors that (theoretically) should remain constant on every RS-232 compatible device, whether DTE or DCE. Last month you saw the interface hardware that corrects the voltage problems of the Commodore RS-232 port to bring it in line with the industry standard.

The DB-25 connector is part of the standard for RS-232. The use of the DB-25 means that there are potentially 25 lines running between two RS-232 devices. Not all 25 lines have to be connected, though. Devices that have just 3-wires running between them, will normally use the DB-25 connector, anyway. The unused pins are just left unconnected. As long as both devices expect the same number of lines to be connected, there is no problem.

While there are potentially 25 lines running between two RS-232 devices, there are usually much less. Generally speaking, manufacturers limited themselves to about 10 lines, maximum.

Here is a table of the 10 most common RS-232 interface lines:

The "Big Eight" RS-232 Lines

Notice in the table that there is one set of bi-directional data lines (RXD/TXD), two sets of handshake lines (DTR/DSR and RTS/CTS), and one set of uni-directional status lines (DCD/RI). These are called the "Big Eight" RS-232 lines by Joe Campbell, in his book. If you understand their operation, you can generally solve any RS-232 interfacing problem (with patience). In addition, there are two common ground lines. Sometimes the two ground lines are combin-

continued on page 108

Here is a table of the 10 most common RS-232 interface lines:

DTE	Mnemonic	Description	DCE	DB-25 Pin
Out	TXD	Transmitted Data	In	2
In	RXD	Recieved Data	Out	3
Out	RTS	Request to Send	In	4
In	CTS	Clear to Send	Out	5
In	DSR	Data Set Ready	Out	6
Out	DTR	Data Terminal Ready	In	20
In	DCD	Data Carrier Detected	Out	8
In	RI	Ring Indicator	Out	22
Common	SG	Signal Ground	Common	7
Common	FG	Chassis (Protective) Ground	Common	1

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Commodore Mailbag continued from page 53

A. I've received several requests for more information on the Delphi User Group "Starship Amiga". Right now, Delphi is offering a special sign-up promotion for the Amiga group, and here are the details:

To logon to Delphi's "Starship", you must have a computer, a modem, and a terminal program. Any kind of personal computer will work, you aren't limited to just using an Amiga. (If you are not already telecommunicating with your computer, I suggest you get a copy of Alfred Glossbrenner's book, *The Complete Handbook of Personal Computer Communications* (New York: St. Martins Press, 1983). He does an excellent job of explaining all you need to know about going "on-line".

You can access Delphi from Tymnet (info: 800-336-0149), Uninet (info: 800-821-5340) or direct dial (info: 800-544-4005). Once connected to one of the two networks above, you will just need to type in the word "Delphi" when prompted by the words "Please Log In:" or "Service:" (depending on the network you are using). They will then connect you to Delphi.

When first connected to Delphi, you will be prompted for a "Username:". At that prompt, type in the word "Starship". Delphi will then prompt you for a "Password:". Then type in the word "Kickstart". If you make a mistake at this point, Delphi will tell you that you have a "User Authorization Failure". Just hit "RETURN" until you get a new "Username:" prompt, and start over.

When the above information is entered correctly, Delphi will then take over, send you to the Amiga subgroup, and you will get a "user friendly" guided tour. You will be given a chance to sign up for Delphi free for a limited time (normally a $50 fee), and probably an hour of connect time. Also, you will be offered, I understand, the Delphi user guide, command reference card, and 3 hours of connect time, for $24. Since the connect time, alone, would usually run about that, it is somewhat of a bargain.

Also, starting March 1, 1986, Delphi is raising it's connect time charges. Right now, off hour use of the system (6PM to 6AM local time) is $6 an hour. After March 1, it will be $7.20. The only consolation is that there will be no surcharge for 2400 Baud Modems! So, for those of you with high speed modems out there, I think you will find Delphi the least expensive national information service. If you hurry, you can get a "locked in" rate of $6 an hour, if you promise to use $24 worth of time a month for a year.

Commodore used to have a BBS system set up just for Amiga developers. That has now been merged into their Quantumlink system. The connect time for this special section of Quantumlink is $6 an hour, and you have to be an "officially approved" Amiga developer to join it. Eventually, Quantumlink is expected to support an Amiga user section, too. Another place that has had extensive content on the Amiga has been *BYTE Magazine's* BIX information service. You might check that out if you need technical help (info on BIX: 603-924-9281).

Early Amiga Bugs Fixed

Q. "I am wanting to know if the "KickStart" program for the Amiga is on ROM yet. I suppose ABasiC will be replaced SOON with Microsoft BASIC. Has it already been replaced? . . . Has the serial I/O bug been fixed yet . . .? When do you think the Amiga's price will drop, if at all?"

Jon Wiklinson
Greenville, SC

A. No, "Kickstart" is not on ROM yet. Commodore has decided to stick with a soft-loaded operating system. The ROM area in the machine has been supplanted by 256K of "write-only" RAM. This makes the Amiga more flexible and expandable, but takes a few more seconds to boot the system from a cold power-up.

The serial port bug that was in early Amigas has been fixed. It seems (interestingly) that it was a minor system software error. New updates of the Kickstart and AmigDOS disks are available with the bug fix. (This is an example of the advantage using a soft-loaded operating system over ROMs. If this bug had been burned into the early Amiga's ROMs, it would have required a trip to the dealer's service department for a fix. Now, all you need is a disk update.)

Yes, ABasiC has already been replaced by Microsoft BASIC. Commodore has been shipping it for "some time now." Early Amiga purchasers are entitled to a free copy, from their dealer. The MicroSoft BASIC is almost 100% compatible with the Macintosh version. So most BASIC programs written for the Mac should run without a lot of trouble.

continued on page 104

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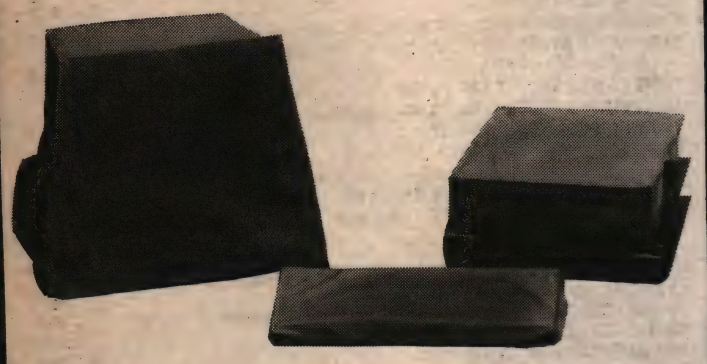
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Commodore Mailbag
continued from page 103

I have looked at the program very briefly, and am impressed. It is a very high level language with a lot of the features of Pascal (local variables, parameter passing to subroutines, block structure, etc.). Of course it also has full screen control, including windows, graphics, sprites, and some provision for multitasking. When the Amiga Microsoft BASIC compiler shows up, I think you will see it used for a lot of development work on the Amiga.

As for a price drop on the Amiga, I think you will see some price errosion on the main unit some time this year. Already mail order dealers are discounting the main box several hundred dollars "under the table." Commodore "officially" frowns on this, but as time goes on, I think you will see more "unofficial" acceptance of mail order discounting (lots of Apples and IBMs get sold this way). You may be able to get a 256K Amiga box for under $1000 in a short while. I don't look for any significant price reductions from Commodore itself until the "next generation" of Amigas roll out later in the year (the 32-bit 68020-based machines that are supposedly in the works).

Amiga Color Printers

Q. "I enjoyed your "Hands On" article in the January 1986 *Computer Shopper*, as I am especially interested in the possibility of purchasing an Amiga . . .

"Now, the fun question: With all that wonderful color, what is the best printer(s) I could buy to get maximum reproduction of the screen color? . . .

Vaughn Tidemand
Roseville, MN

A. For maximum color reproduction, you would want to use a 4 color laser printer. Although the technology for producing them exists, a 4 color laser printer would probably cost something like $20,000. So, in lieu of that, you will probably want to settle for one of the numberous color dot matrix or ink jet printers now on the market.

The Amiga was designed to interface to color printers from the very beginning. Software drivers are provided with each Amiga that support several popular color printers now on the market.

A recent issue of *Commodore Power/Play* magazine had a cover story devoted to the Diablo C-150 Color Ink Jet printer. It's a beautiful printer, one of the few that are capable of printing all 4096 colors of the Amiga screen. The price, however, is a little high at $1295, about the cost of the Amiga itself! If maximum reproduction quality is your goal, the Diable will do an excellent job.

For less money (and less quality), you might also consider the Epson JX-80 ink jet printer. Epson has recently lowered the price on it to $399 (from $599). It provides reasonable resolution and color for a fraction of the cost of the Diablo.

If you are on a real budget, you will probably want to settle for the Okidata OkiMate 20. At $199, it is the least expensive color printer on the market. Although it's resolution, color selection, and speed are not equal to either the Diablo or Epson, it provides very reasonable color hardcopy for the price.

The User Port Printer Driver and SpeedScript 3.0

Q. "Recently you published a letter . . . (in which) . . . a reference was made to a Centronics parallel driver program. Several of us here have been trying to (use) your program and SpeedScript 3.0. Not having an index of your back issues, would it be possible to get a photocopy of the driver program?"

Shelly Parker
568 Landover Pl.
Gahanna, OH 43230

A. This letter reminds me of something I want to announce to all our readers. Starting with the November '85 issue of the *Computer Shopper*, reprints of any articles are available directly from the *Shopper* for $3.50 each. These are high quality 8x10 reprints. Address inquiries to the *SHOPPER*, "Attention Annda Lahee". She will get you a copy in the mail right away.

Unfortunately, the printer driver program you are referring to is in the August '85 issue, and isn't available as a reprint. The only way to get a copy of the printed program is to find someone who already has an old issue.

Better still, get a new copy of the printer driver (described fully in this month's "Inside Commodore" column) already on disk. I am planning on including a special version of the new printer driver that is specifically designed for use with SpeedScript 3.0. Full details can be found in the "Inside Commodore" column.

Reader Recommends "Paperback Writer"

Q. ". . . having read your Jan. '86 review of KWICKWRITE, I would suggest you have a look at a package called Paperback Writer by Digital Solutions Inc. This is definitely one of the most transparent pieces of software I've ever used. It offers either 40 or 80 col. and includes a spelling checker. Text format-

continued on page 109

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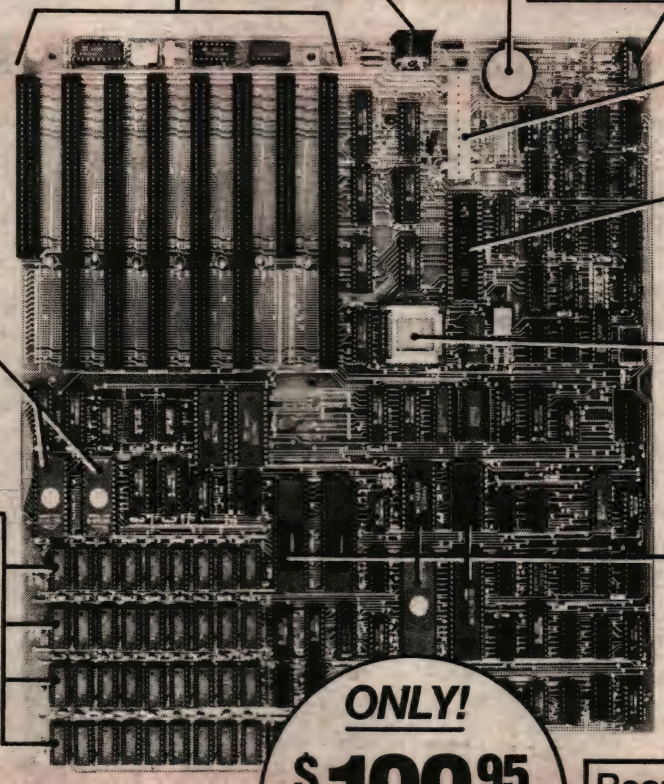
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The answer is simple—like many computer products, this printer was sold by one company to another company, which put its own label on it. In this case, C. Itoh sold these printers to Commodore which intended to sell them with an expensive business computer they were developing. The expensive computer took a lot longer to develop than Commodore anticipated—so they were stuck with these printers. Then they tried to sell them with their inexpensive computers—and you can imagine the result. How many people do you think would buy a printer with a list price of $1795 to go with a Commodore 64? You're right. Very few.

So we were able to acquire a great printer, made by a company known for its high quality printers, with only one drawback—the Commodore label on it, which falsely suggests that it is a low end printer.

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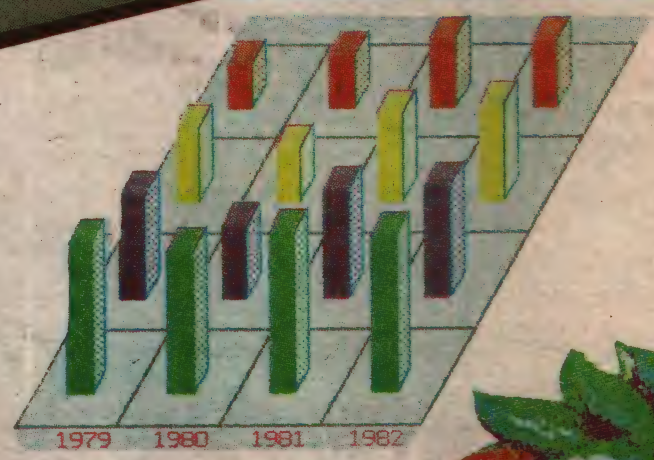
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Printing method: Drop on demand ink jet printing
Print head: Piezo-electric type
Nozzle: Four horizontally arranged nozzles
Printing direction: Bi-directional line scanning
Printing characters: Character composition: Standard 5x7 dot matrix; Character set: full ASCII character set (96) and special characters; Character size: 1.5 x 2.7mm (standard), 30 x 2.7mm (enlarged)
Maximum characters per line: 80 chars per line standard, 40 chars per line enlarged

Specifications

Image printing: Image data: vertical 8 dot information; Resolution: 560 dots per line
Color hard copy: Data: horizontal 8 dot information; Resolution: 640 dots per line
Interface: 8 bit parallel interface (Centronix type)
Paper: Paper type: plain paper; Roll paper: max width 8½″, max. diameter 2¾″; Single sheet: max width 8½″
Overhead projection film: A-4 single sheet (Canon specified only)
Ink cartridge: Type: dual-cartridge ink supply; Ink amount: black-25cc, other colors—20cc each; Ink life: approx. 3.5 million characters per color
Physical dimensions: Size: 15¾″ x 11⅝″ x 4¼″; Weight: 12.3 lbs.



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Inside Commodore continued from page 102

ed into a single, common ground.

Let's look at the "Big Eight" lines a little closer.

The TXD/RXD Data Lines

The two data lines, "transmitted data" (TXD) and "received data" (RXD), are the serial data transfer lines. TXD sends data to the DCE from the DTE and RXD send data the opposite direction. Because there are two separate lines for data transfer, it is possible to have "full duplex" communication. This means (theoretically) that a DTE or DCE could be sending and receiving data at the same time.

In practice, the separate data lines provide a convenient means of implementing a software handshaking system. One device will send data over its outgoing line to the other, and then occasionally poll its incoming line for a signal that tells it to quit sending. If that happens, it then stops and starts polling the incoming line until it receives another signal to start sending again. This software handshaking system is called an "Xon/Xoff" protocol, and is used by most telecommunication systems. There are also two pairs of hardware handshake lines, the DTR/DSR pair, and the RTS/CTR pair.

The DTR/DSR Handshake Pair

The "data terminal ready" and "date set ready" (DTR/DSR) pair were originally used to inform the devices they were connected to each other and turned on. (Notice that the DCE ready line is called "DSR" and not "DCR"...I don't know why.) You may wonder why these lines are not used at all.

Remember, the original use of RS-232 was to connect a terminal and modem. Often remote DTEs were connected to DCEs that were hundreds or thousands of feet away from each other. The DTR/DSR lines provided a convenient way to check if the other device was connected and turned on for use, without having to physically check. For a DTE and DCE sitting together on the same desk, DTR/DSR would seem to be less critical.

But, a DCE often uses DTR as a means of checking to see whether it is OK to send data to the DTE over RXD. Since there is no "DCE to DTE" data handshakig line, this is often the only way that the DCE can tell if the DTE is able to take more data.

(The reason no formal "DCE to DTE" handshaking exists in RS-232 is because it was assumed that the DCE would be a low speed device, and the DTE would be a high speed device with nothing to do but to receive data from the DCE. In this scenario, the only reason, that the DTE couldn't receive data is if it were turned off. The only problem is the DTE is a computer, and not a terminal, then it might have other things to do besides listen to a DCE all day. And, if the DCE is really another computer, it may be able to send data as fast or faster than the DTE could receive it.)

The RTS/CTS Handshake Pair

"Request to send" and "clear to send" (RTS/CTS), are the primary handshake lines for data transfer operations from the DTE to the DCE. RTS (Request to send) is really the DTE's way of asking the DCE if it is OK to continue sending data over the RXD line. As long as the DCE is ready for input, the DCE keeps CTS (Clear to Send) high, indicating every thing is OK. When CTS is low, the DTE knows that the DCE is busy and it waits for a clear. Similarly, if the DCE sees RTS low, it assumes that the DTE is not going to send data for right now.

The Status Lines

There are two "one way" status lines that run from the DCE to the DTE only. These are specialized signals that tell the DTE specific things about the DCE. They are most often used with "auto-answer" modems and BBS systems.

The RI (ring indicator) line tells the DTE when the auto-answer modem is being rung. This alerts the DTE to expect data transfer and is used by BBS programs to detect and log-on callers.

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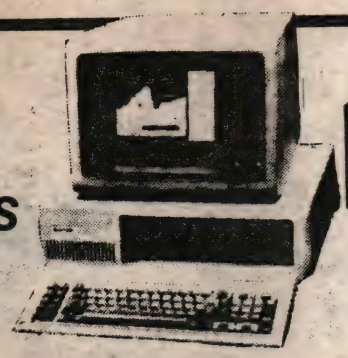
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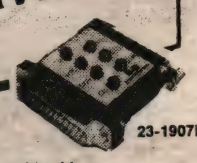
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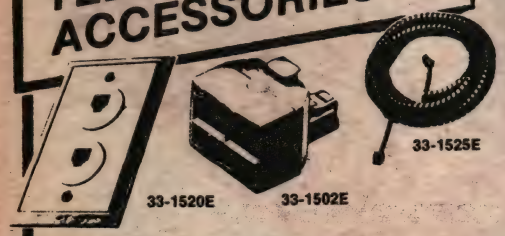


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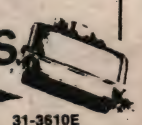
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Joe Pitre
Edmunton, Alberta Canada

A. This is not the only praise I've heard for "Paperback Writer." Digital Solutions is selling both C-64 and C-128 versions of the program. The C-128 version is quickly becoming the word processor of choice for that machine. I still use "Kwick-Write" for most word processing that I do on the 64 because it's so powerful, easy to use and fast. But, if I were dissatisfied with it, I think I would seriously check out "Paperback Writer."

Using PC-DOS Disks With the 1571

Q. "In the January issue of the *Computer Shopper*, you indicated it was possible to reprogram the 1571 disk drive to read IBM PC-DOS disks. Could you possibly elaborate on this topic by 1) suggesting a book (perhaps *1571 Internals by Abacus Software*?) or 2) suggest some other source for this information or 3) explain (generally) how the 1571 could be programmed to accept PC-DOS disks? It would be greatly appreciated since IBM software is so prevalent, it seems a common (and easy) solution should be available.

P. Zimmerman
Philadelphia, PA

A. Most of the information you need about the 1571 can be found in the reference manual that's provided with the drive. (The 1571 manual is a great improvement over the sparse manual provided with the 1541.) I'm sure that Abacus book on the 1571 is an additional reference that would be very valuable for anyone doing serious hacking with the drive.

To read PC-DOS disks, you will have to write a stand-alone program that uses the 1571's ability to read MFM disks by sectors. Study the directory structure of PC-DOS disks (found in the "IBM PC-DOS Reference Manual" among other places), and learn how to locate file sectors on the disk from the directory information. Using the MFM mode of the 1571, you should be able to write a program that reads files, by sector, from the PC-DOS disk to a RAM buffer in the C-128. Then, you can later save the RAM buffer to a C-128 formatted disk.

The reason that PC-DOS disks can't normally be read by a C-128 in the CP/M mode is because CP/M uses a very different directory and file structure. While the 1571 provides the necessary hardware to do the job, the software has yet to be written. If there is enough interest in this type of program among our readers, we may attempt something like this in a future article.

C-64 RAM Disk Project

Q. " . . . I would be interested in a RAM disk project similar to the Atari project presented in the September '85 *BYTE*. Please inform me any past projects and info on back issues containing them."

George Wolter
Whitehall, MI

A. Several readers have written me asking about the possibility of a RAM disk expansion for the C-64. I haven't come across any "easy to build" plans for one. The Atari article mentioned above is a unique project that replaces the 64K RAM chips in the 800XL with 256K chips. Then, using a bank switching approach, you can address eight banks of 32K each. I do know that such a device is theoretically possible for the 64, but the details have yet to be worked out.

A reliable rumor from those "in the know" is that the C-128's 256K and 512K RAM cartridges will be compatible with the C-64, but the fact won't be advertised by Commodore. If and when these cartridges appear, I will try to get C-64 compatility information to out readers.

More C-128 CP/M Questions

Q. "My question is about CP/M on the 128 with a 1541 drive. All of the disks in the User Groups are, I belive, MFM format (Kaypro, Osborne, etc). The manual says that the 1541 can only read GCR format. I have tried some CP/M Users Group disks in Osborne and other formats and get a BDOS error #15 or 17. Is there any way to get around this problem?"

Samuel Freund
Montclair, NJ

A. For all practical purposes, the only way to read MFM disk into your C-128 is with a 1571 drive. The 1541 will only read single sided Commodore formatted CP/M disks, that are recorded using the GCR method. With total (and I mean TOTAL) reprogramming of the 1541 disk controller, you might somehow be able to get it to read MFM. But, even that would have only limited usefulness, since the 1541 is a 35 track drive and almost all CP/M MFM disks are 40 track or more. So, for the price, the 1571 is a much more efficient solution than trying to upgrade a 1541 to read MFM.

Notes on Using Commodore 1525 and 801 Printers

Q. "You may want to tell your readers NEVER to pull a page of labels back out of an

continued on page 115

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Similarly, the DCD (data carrier detect) line tells the DTE whether a modem carrier is being received from the "far end" or not. This is also used by BBS systems to detect when a caller has hung up on the other end, because when that happens, no modem carrier will be detected.

Sometimes a DTE will use DCD as a third handshake line. It will not send data to the DCE until DSR, CTS, and DCD are all three high. You might remember to check that, if your DTE won't talk to your DCE for some unknown reason.

User Port Connections

Commodore has provided for all of the "big eight" lines on the User Port interface. (Although not all are implemented in the software.) For reference, you might want to look at page 355 of the C-64 PRG, and compare it to the above table (VIC-20 PRG, page 257). (Notice that for RXD to work, you must connect to two User Port pins, C and B. The other lines connect to just a single User Port pin each.)

3-Line and "X"-Line Handshaking Interfaces

As I mentioned earlier, it is possible to connect up and run with just three lines. This type of interface has two way data lines (TXD and RXD) a "common" ground line (for both FG and SG). This type of interface does all of its handshaking through software and ignores the value of RTS/CTS, DTR/DSR, and the status lines. Commodore refers to this as a "3-line" interface. All handshaking is done with the "Xon/Xoff" software system, described earlier. Most "dumb" modems use this 3-line interface.

When connecting to a device that does hardware handshaking, like a printer or a modem with many "bells and whistles," it's not uncommon to use most of the "big eight" lines. Commodore, in its literature, calls this second type of interface the "X-line" interface. The "X" means that the actual number of lines connected will vary depending on the device you are interfacing to.

DTE to DCE Connections

Hooking a DTE and DCE together is not a problem at all, as long as both devices are using the same amount of handshaking signals. If both are using the 3-line interface, then it's just a matter of connecting TXD, RXD, and the ground lines together.

On the other hand, if one of the devices is expecting the RTS/CTS, or DTR/DSR pairs to be connected (and X-line interface), and the other device doesn't use that line, we have to do something to accommodate it. Often this is done by pulling the offending line high.

For example, what if a DTE needs to see a DSR line high before it will transmit, and the DCE doesn't have one? You could wire up a jumper from the DTE's DTR line (which will go high when the DTE is ready to transmit) to the DSR line. Then, when the DTE looks at the DSR line, it will see it's own high DTR and think everything is O.K.

The hard part of fixing a non-working DTE to DCE connection, is figuring out which lines are missing. Once you understand how the signals talk to each other, the rest is simply a matter of trial and error.

It's possible to construct jumpers for almost any configuration that will fool either the DTE or DCE into getting the needed signals to complete the handshaking.

Making the patch becomes easy. On the interface I described last month, I described how the wire wrap construction of this project simplifies this.

Problems With Printers

Now we know how to connect two a DTE to a DCE devices, so they can talk to each other. It should not be any problem at all getting a computer talking to an RS-232 printer then right? Well, maybe yes and maybe no. It all depends on the printer.

Unlike what you would normally expect, most RS-232 printers are not configured as DCE equipment. Instead, they are usually set up as DTE equipment! When your computer talks to them, it doesn't see a modem, it sees another terminal. This same problem happens when you try to connect two computers together.

Now, what happens if we connect two DTEs together? Well, each DTE will be setting RTS high as an output and looking for an acknowledgement from the other device via the CTS line. But on both machines, CTS will be an input. So it will never go high, therefore both DTEs will sit there waiting for a signal to appear. That's why many people have a difficult time using a "DTE only" interface (like the VIC-1101A) to connect to a printer.

Fooling the DTEs By Doing the Double Cross

By crossing the handshake lines on two DTE devices, we can convince them that they are talking to the correct type of device. For example, if we send the RTS signal of one

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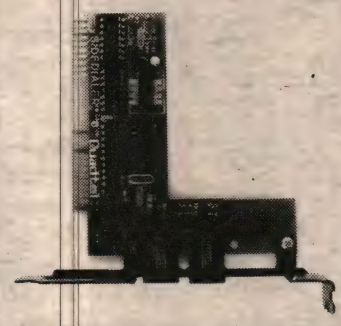
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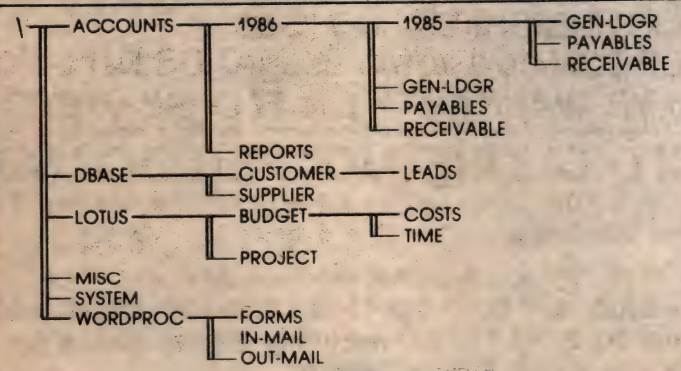
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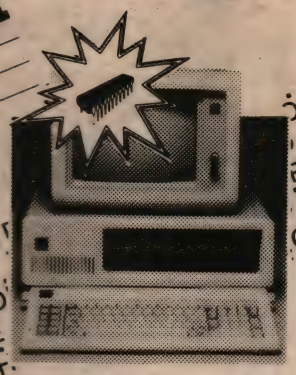
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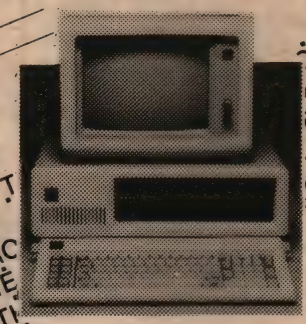
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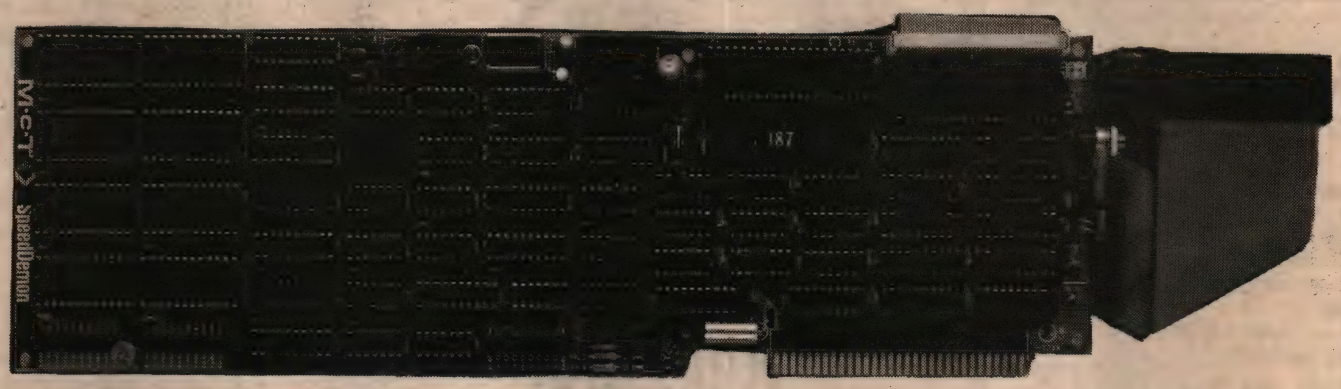
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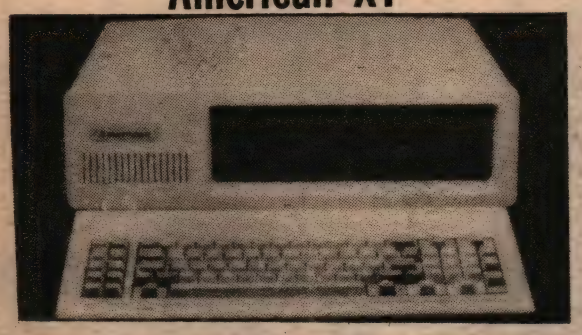
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American XT



American XT Personal Computer

American XT Computer System Unit

Highlights Include:

- 256KB user or random access memory (RAM) standard...expandable up to 1MB on the system board (640KB DOS accessable).
- 8KB permanent or read only memory (ROM), which contains the BIOS and 56KB user usable.
- High-performance, high-speed, 16-bit 8088 microprocessor.
- Eight expansion slots that allow easy system expansion by using optional plug-in adapters.
- Two 360KB slim line diskette drives to support single-sided or double-sided, double-density, 5¼ inch diskettes.
- Optional 10MB or 20MB fixed disk drive.
- 135W power supply 110V/220V switchable.
- Four layer mother board to increase system reliability.
- Speaker for audio and music applications.
- Power-on automatic self-testing of system components.

Keyboard

American XT computer comes with a slim, lightweight keyboard. It features:

- An 84-key, typewriter-like format to help make it easy to learn and operate the system.
- A six-foot coiled cable that allows convenient movement of the keyboard.
- Power, caps-lock and num-lock LED indicators.
- A 10-digit, calculator-like numeric keypad for entering numbers quickly and easily.
- 10 special function keys to save time in activating commonly repeated tasks.
- A special "print screen" key that enables you to print out anything that appears on your display screen at any time.
- Typing angle can be adjusted to suit your working position.
- Optional enhanced keyboard with separated cursor and numeric keypad.

Hardware Specifications:

Size: width—20", depth—16", height—5.5".
Weight: without diskette drive—21 lbs; with two drives—28 lbs; with hard disk—33 lbs.
User Memory: cycle time—410 nanoseconds; access time—250 nanoseconds.
Environment: air temperature—60°F to 90°F system ON, 50°F to 110°F system OFF; humidity—8% to 80% system ON, 8% to 80% system OFF; noise levels-59dB (without printer); electrical—120V/220V AC, 60/50 cycles, 200 watts.

Software.

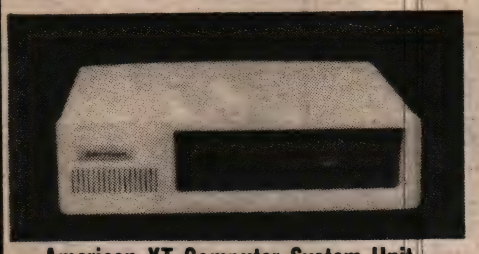
Runs all the popular programs written for the IBM PC/XT using the MS-DOS version 2 operating system.

System Specifications:

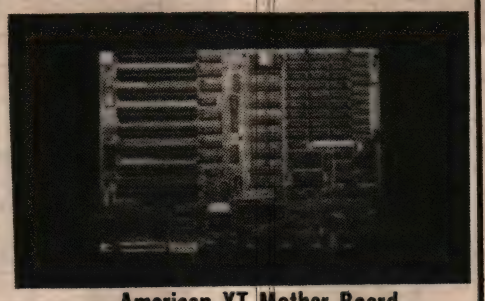
- **Model 1, Basic System.**
  - ☐ **256K bytes random-access memory (RAM).**
- **Model 2, Office System.**
  - ☐ 256K bytes random-access memory (RAM).
  - ☐ Two diskette drives with controller.
  - ☐ Color graphics card or monochrome card.
- **Model 3, Business System.**
  - ☐ 640K bytes random-access memory (RAM).
  - ☐ Two diskette drives with controller.
  - ☐ I/O plus with serial, parallel, game port and battery backup real time clock.
  - ☐ Color graphics card or monochrome card.
- **Model 4, Professional System.**
  - ☐ All the features of model 3 plus a 10MB fixed disk drive.
- **Model 5, Executive System.**
  - ☐ All the features of model 3 plus a 20MB fixed disk drive.

Introducing the most COMPATIBLE & AFFORDABLE Desktop Computer American XT/AT

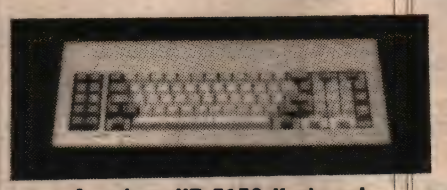
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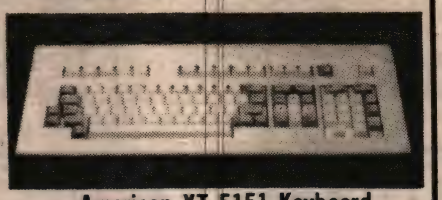
American XT Computer System Unit



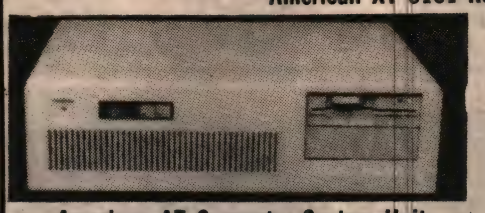
American XT Mother Board



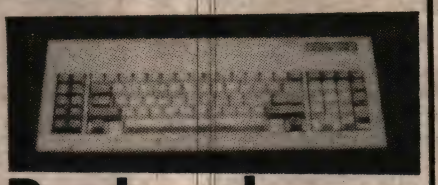
American XT 5150 Keyboard



American XT 5151 Keyboard



American AT Computer System Unit



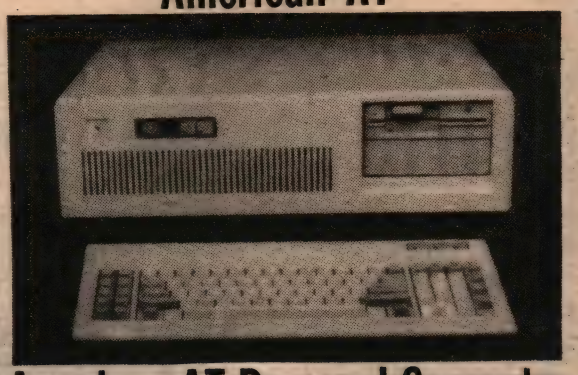
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American AT



American AT Personal Computer

American AT Computer System Unit

Highlights Include:

- 512KB user or random access memory (RAM) standard...expandable up to 4MB by adding memory feature cards.
- 64KB permanent or read only memory (ROM), which contains the BIOS.
- High-performance, high-speed, true 16 bit 80286 microprocessor.
- Eight expansion slots that allow easy system expansion by using optional plug-in adapters.
- 1.2M high capacity disk drive to support 5¼ inch diskette.
- 200 watts power supply 110/220V switchable.
- Battery backup for CMOS configuration table and real-time clock.
- 7-channel direct memory access (DMA).
- 16-level interrupt.
- Three programmable timers.
- Speaker for audio and music applications.
- Power-on automatic self-testing of system components.

Keyboard

American AT computer comes with a slim, lightweight keyboard. If features:

- An 84-key, typewriter-like format to help make it easy to learn and operate the system.
- A six-foot coiled cable that allows convenient movement of the keyboard.
- Cap-lock, num-lock and scroll-lock LED indicators.
- A 10-digit, calculator-like numeric keypad for entering numbers quickly and easily.
- 10 special function keys to save time in activating commonly repeated tasks.
- A special "print screen" key that enables you to print out anything that appears on your display screen at any time.
- Typing angle can be adjusted to suit your working position.

Hardware Specifications:

Size: width—21.3", depth—17.3", height—6.8"
Weight: without diskette drive—33 lbs.; with one drive—37 lbs.; with hard disk—42 lbs.
User Memory: cycle time—275 nanoseconds; access time—150 nanoseconds.
Environment: air temperature—60°F to 90°F system ON, 50°F to 110°F system OFF; humidity—8% to 80% system ON, 8% to 80% system OFF; noise levels-59dB (without printer); electrical—120V/220V AC, 60/50 cycles, 300 watts.

Software.

Runs all the popular programs written for the IBM PC/XT using the MS-DOS version 3 operating system.

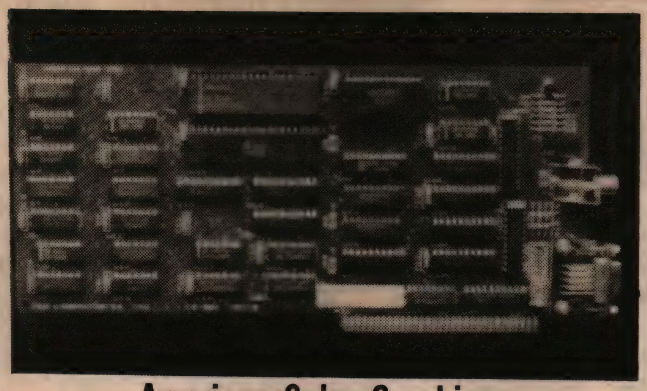
System Specifications:

- **Model 1, Basic System.**
  - ☐ 512K bytes random-access memory (RAM).
- **Model 2, Office System.**
  - ☐ 512K bytes random-access memory (RAM).
  - ☐ One diskette drive with controller.
  - ☐ Color graphics card or monochrome card.
- **Model 3, Business System**
  - ☐ 512K bytes random-access memory (RAM).
  - ☐ One diskette drive with controller.
  - ☐ Serial/Parallel interface card.
  - ☐ Color graphics card or monochrome card.
- **Model 4, Professional System.**
  - ☐ All the features of Model 3 plus a 20MB fixed disk drive.
- **Model 5, Executive System.**
  - ☐ All the features of Model 3 plus a 40MB fixed disk drive.

American ADD-ON

American Color Graphics Card

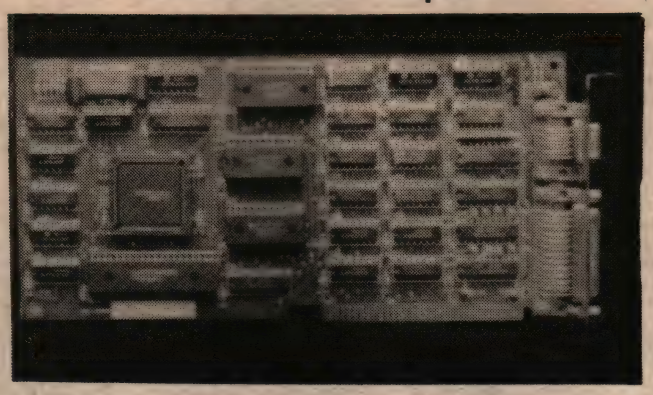
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- RGB and composite outputs with 640 x 200 pels compatible to IBM standard.
- Light pen and RF modulator interface standard.



American Color Graphics

American Monochrome Card

- Use state-of-the-art technology GATE ARRAY CHIP to increase reliability and reduce cost.
- TTL output 720 x 350 pels with 25 lines x 80 column compatible to IBM standard.
- Built-in parallel printer port.



American Monochrome

Floppy Controller Card

- Can control up to 4 drives.

Monochrome Graphics Card

- TTL Output 720 x 350 pels with 25 lines x 80 column for text mode.
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- Built in parallel printer port.

I/O Plus Card

- Serial, parallel, game ports and real time clock.
- 2nd serial port optional.

Multifunction Card

- 384K RAM Sockets.
- serial, parallel, game ports and real time clock.
- With RAM Disk and PSPOOL software.

Hard Disk Controller Card

- Control up to 2-20M hard disk

Serial/Parallel for AT

- Serial and Parallel Interface card for AT.

Controller Card for AT

- Control 2-1.2M floppy disk drives.
- Control 2-20/40M hard disk drives.

American HD

American Hard Disk System

10MB Hard Disk System:

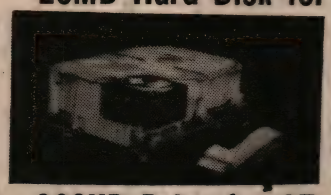
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- Simple installation.



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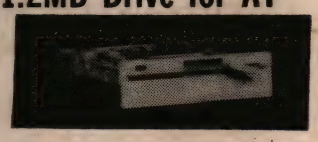
- Formatted and tested.
- Full size panel with controller card.
- Simple installation.

20MB Hard Disk for AT





1.2MB Drive for AT

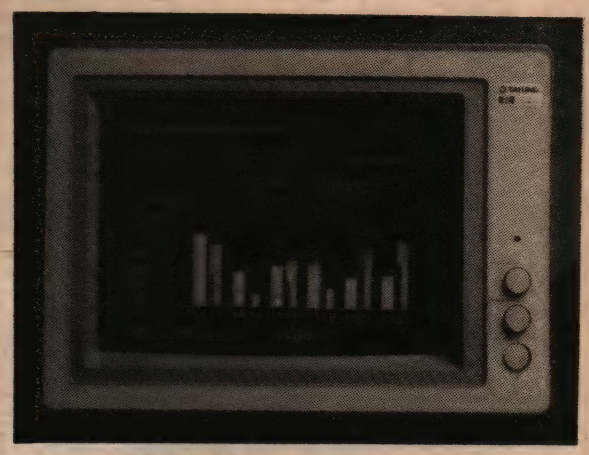


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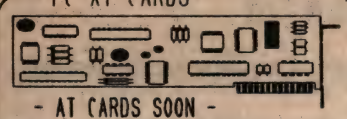
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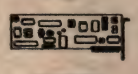
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Inside Commodore continued from page 110

device over the CTS line of the other, then one DTE will think that its CTS line has gone high, when in reality, it is looking at the other DTE's RTS line. When we cross all the required lines, the handshake will be complete and data will begin to flow. So, by crossing all the handshake lines we can fool one of the DTEs into thinking it's actually talking to a DCE.

Here's how the criss-crossing is actually done between the two devices:

DTE # 1		DTE # 2
TXD	----------	RXD
RXD	----------	TXD
RTS	----------	CTS
CTS	----------	RTS
DTR	----------	DSR
DSR	----------	DTR
GND	----------	GND

Switching the Lines

So, how do you actually do this dirty "double cross" to the interface? Well, you can construct a special cable that will switch the interface lines beween the two. Or, as we saw last month, you can include switches right on the interface itself, to simplify the process. That way, you can use the same cable to connect to both another DTE device or a DCE.

You may also find that the printer uses not just CTS as a handshake line, but also DCD (carrier detect). If this is a problem, you may find that you have to jumper your CTS to the DCD line as well.

Hooking Up Another Computer

Connecting up to another computer may require either a full "X-line" or just a simple 3-line interface. It often depends on the software you are using as well as the hardware. For example, with the Commodore software UART, you can open a channel that is just a TXD/RXD connection (that will ignore the values of CTS and DSR). Or you can open a channel that will do full hardware handshaking.

I have my Zenith Z-150 connected to my C-64 and I run 1200 baud file transfers between the two using just a 3-line interface. At higher speeds (4800 baud up), however, hardware handshaking becomes more desirable.

Summary: A Path Through the Jungle

As I said in the beginning, understanding all of the RS-232 interface is quite a task. My goal here is to clear a (narrow) path through the jungle of confusion, not build a super highway. Hopefully, some of the jargon is a little clearer.

If you are having special problems with an RS-232 printer, I suggest you read Campbell's book that I referred to earlier. He goes through the process of connecting several difficult printers to the various computers, and I have found this to be most useful in solving RS-232 interface problems.

Timeworks C-128 Software A Retraction

A couple of months ago, I mentioned that I had briefly seen some of the Timeworks software for the C-128, the "Word Writer 128" and "Swift Calc 128" packages. I commented that the programs seemed to be a lot better than the dismal C-64 packages of the same name.

Since then, numerous owners of C-128s who have used these packages have assailed me as being less than competent in even implying that the programs were worth the disk they are saved on! Seriously, from what I've heard, even though the programs have some advanced features (like spelling check and "sideways" printing) the programs are still buggy and have a lot of the same problems that the 64 versions did.

So, I officially want to print a retraction of any endorsement that I made for the Timeworks software. Not being a regular user of the said software, I didn't have time to find the bugs in them, I guess. For now, I recommend that you get your hands on the pro-

continued on page 115

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Commodore Mailbag
continued from page 109

MPS 801 printer. The labels get stripped off the page and get stuck in the page guide. You have to completely disassemble the printer to get these out. It took me about 8 hours."

"You can reink MPS 801 ribbons by putting about 5 drops of computer printer ink on the felt tip cartridge in the ribbon and let it sit felt tip up overnight. It's a lot cheaper than $12.95 for a whole ribbon."

". . .The ribbon advance spindle (the little philups-head looking part . . .) has a one way friction spring surrounding its shaft. This spring is bent back at one end to form a latch which goes into a spacer. This latch will break off if you so much as sneeze at the printer. (When this happens) the ribbon will not advance and it will get burned by the print-head pins. (To fix it) . . . take the printer out of its case, line up the bottom of the print head carrier with a hole in the baseplate and pull a little circlip to get at this spring so you can make a new latch. Bend the spring back in a nice arch. Otherwise it'll snap off again."

Francis O. Saffell
(aka Dream Dog)
Eugene, OR

A. Thanks for the tips on the MPS-801! Some of our readers out there with 801s may find this helpful. I read, with a slight chuckle, your comments on using labels in the 801. Not because it's funny (believe me, I know it's not!), but because I had exactly the same problem with my 1525, the predecessor to the 801. I was amazed that you were able to get your 801 apart and back together in 8

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Inside Commodore
continued from page 114

grams yourself, and make your own decisions.

From what I understand, Timeworks will buy you another program if you decide that you are unhappy with their software. Always insist on a reasonable return policy, I say. I will try to refrain from "waxing eloquent" about any C-128 programs that I haven't personally "put through the paces" from now on.

Lower Price C-64 Hard Disk System

Cardco and Financial Information Inc., made the announcement at the January CES show that they intend to jointly market Financial Information's "Lt. KERNAL" C-64 hard disk system under the Cardco label. The announcement said that a 5 Meg. system would run under $600.

This may be the first of a new series of lower priced hard disk systems for the C-64 and C-128. Even though Cardco is breaking some new ground for Commodore systems with this announcement, the overall price is stil higher than comparable Apple and IBM hard disks.

The Financial Information 10 and 20 Meg. drives are still be priced at the current $1000-1500. At any rate, I'm sure we'll hear a lot more about his particular drive (and maybe some others) in the year ahead. ●

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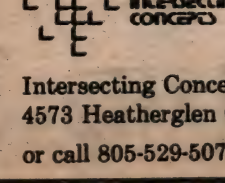
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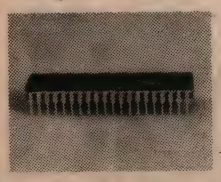
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Probots and People

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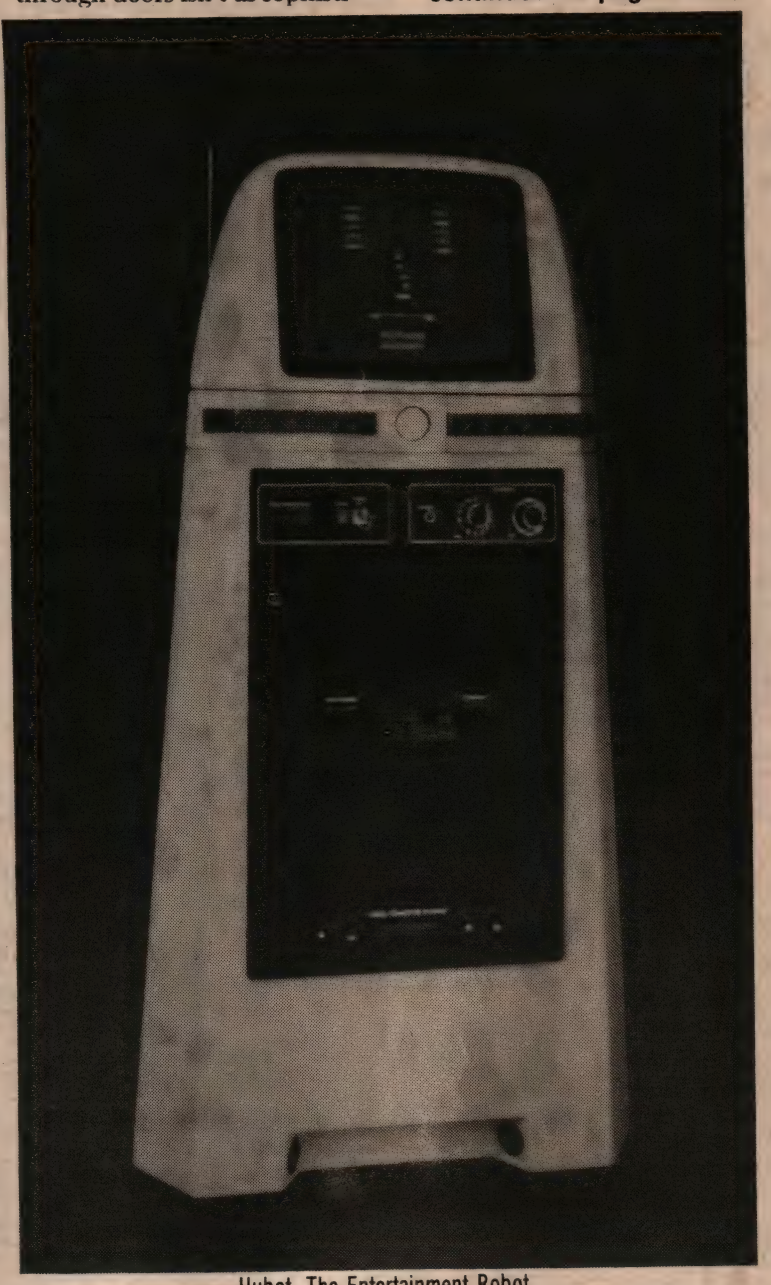
stereo don't enhance the functionality of the robot. In addition, the price tag of $3,495 certainly limits the potential buying audience. However, having *quality* extras on robots (perhaps a very advanced video game system or a fine compact disc player) may make them more attractive to consumers and, as an entertaining companion, more functional.

Elami and Other New Robots

More recent additions to the world of big personal robots include Elami and Gemini. Elami is made by North American Robotics (a subsidiary of the Robotland store in Boca Raton, Florida) and comes in three different sizes--12 inches, 18 inches, and 36 inches. The 12-inch version can move about and detect obstacles with bumpers and a sensor; the 18-inch Elami has a face synchronized to the voice synthesizer, a head that moves, and an onboard microprocessor. The 36-inch version has a 64K microcomputer system, two articulated arms, voice recognition, voice synthesis, and a variety of tactile sensors. I hayen't seen these robots demonstrated, but if they do everything they're supposed to do, I would be extremely impressed and would highly recommend them. However, I'm sorry to say that over the years I've heard a lot of great things about some robots, but when I actually tried them, either the features are extremely disappointing or are "in the works" (translated: will never be available). I want a great personal robot to exist more than anybody, but it's not hard to be cynical when you've heard fantastic claims before and wound up being disappointed.

One good example is the Gemini robot. The Gemini's list of features is as long as my arm--voice recognition, voice synthesis, navigation, on-board computer, and so on. The price tag of $6,495 is very high, but I was excited when the two engineers who had made the Hubot stopped by at my store to show me the robot. I found out, however, that its "navigation system" that directs it through doors isn't as sophisticated as one might imagine; it reportedly takes Hubot a full minute to get through a door. That means that if Hubot is in your bedroom and you want it to travel to the living room, it could take a very long time to get there. Moreover, the add-ons described in the product literature are a little too expensive for what you get. For instance, how many of you

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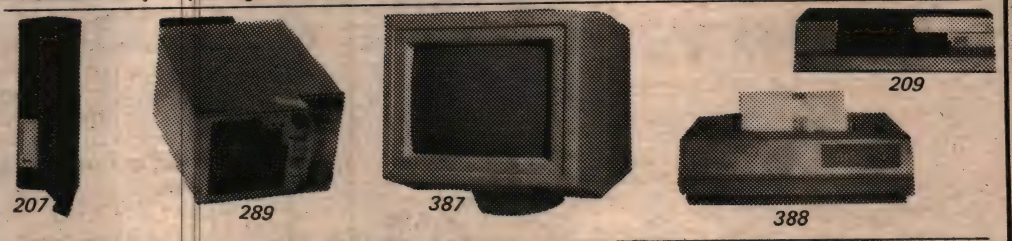
Hubot, The Entertainment Robot

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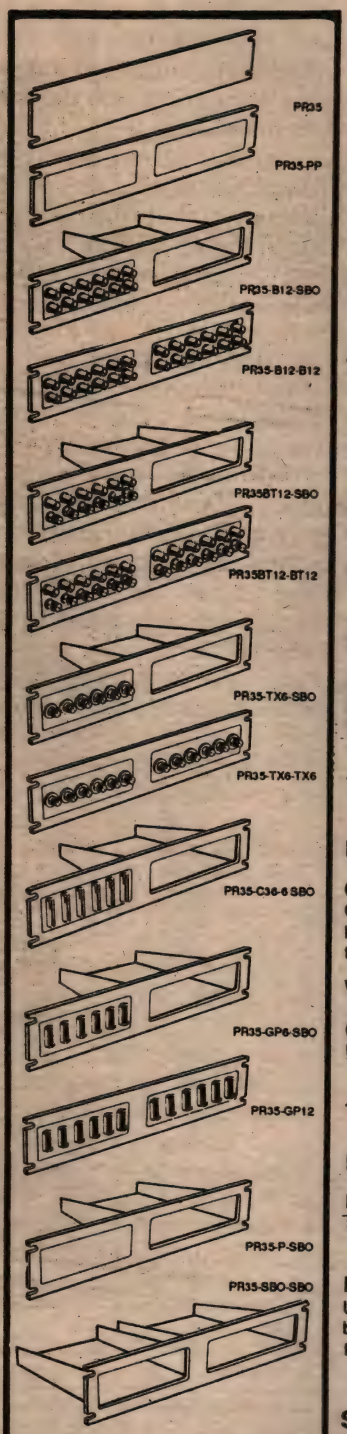
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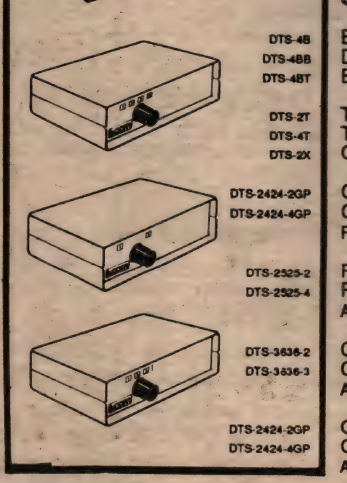
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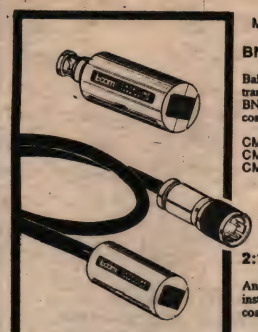
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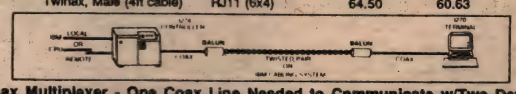
DTS-4B DTS-4BB DTS-4BT	BNC: Switch up to 4 compatable devices to a 5th DUAL BNC: Switch up 4 Prs. of compatables to a 5th BNC & TNC: Switch up 4 Prs. of compatables to a 5th	89.00 129.00 129.00
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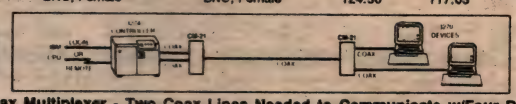
Baluns act as coaxial cable eliminators allowing IBM 3274/6 mainframe controllers and 34, 36 and 38 Mini Systems to transmit data over twisted pair, or via an existing cabling system, to a remote terminal. Use them in pairs with each of the BNC ends connected to the controller and terminal. These baluns are very simple to install, save time, and provide a total cost savings that more than offsets the initial cost of the baluns. Your choice of coax termination types.



2:1 Coax Multiplexer - One Coax Line Needed to Communicate w/Two Devices					
CM-21	BNC, Female	BNC, Female	124.50	117.03	109.56

An economical interface between controllers and type A devices. The 2:1 Passive Coaxial Multiplexer allows the user to install two 3270 devices on an existing coaxial cable. No external power is required. Simply a matter of reconnecting the coaxial lines. Used in pairs.

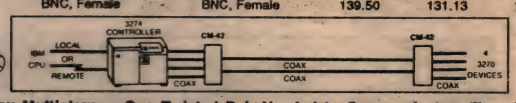




4:2 Coax Multiplexer - Two Coax Lines Needed to Communicate w/Four Devices					
CM-42	BNC, Female	BNC, Female	139.50	131.13	122.76

Passive Coaxial Multiplexers serve as interfaces between controllers and type A devices. Multiplexers enhance the systems flexibility by letting the user increase the number of 3270 devices that can use the existing coaxial lines. No external power is required and multiplexers are simple to install.

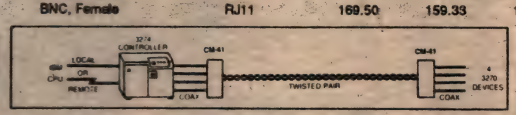




4:1 Coax Multiplexer - One Twisted Pair Needed to Communicate w/Four Devices					
CM-41	BNC, Female	RJ11	169.50	159.33	149.16

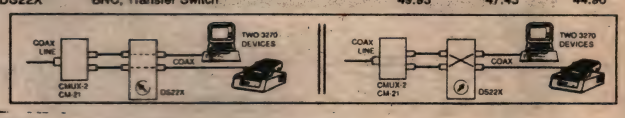
Very similar to the 4:2 Multiplexer described above, except this allows up to four terminals to communicate with up to four controllers via one pair of twisted wires. This is truly a savings in time, labor and materials, which more than offset the cost of a pair of Quad Multiplexers.





MODEL	DESCRIPTION	1-4	5-9	10-24
Crossover Switch - Flip of the Switch Allows Terminals to Crossover Lines				
DS22X	BNC, Transfer Switch	49.95	47.45	44.96

Use with the 2:1 Multiplexers to enable independent switching of two IBM 3270 Type A devices to two controller lines. On the first positon, the lines run straight through to the terminals and on position two, the lines are reversed allowing a crossover of the terminals.



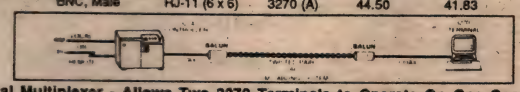


MODEL	TYPE / GENDER	TERMINATION	SYSTEM	1-9	10-24	25-99
BNC Coaxial Baluns - A Simple Conversion to Modular or Twisted Pair Wiring						
CF-11	BNC, Female	RJ-11 (6 x 6)	3270 (A)	44.50	41.83	39.16
CM-11	BNC, Male	RJ-11 (6 x 6)	3270 (A)	44.50	41.83	39.16

This new method of interconnection offers the simplest and most economical alternative to the complexities and high cost of traditional coax cabling of terminal systems. Our Coaxial Baluns serve as passive In-Line Devices, converting data signals to transmit twisted pairs or existing telephone lines. A typical system consists of a pair of eliminators which are plug-adaptable to your existing equipment. A logical way of planning or expanding your 3270, type A, terminal system. Span distances up to 1000 ft. without degradation in performance, impedance, disruption, or speed. Each unit has a built-in terminal strip for the user to optionally use screws or the RJ-11 termination.

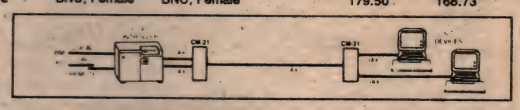


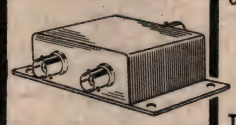




Coaxial Multiplexer - Allows Two 3270 Terminals to Operate On One Coaxial Line					
CMUX-2	BNC, Female	BNC, Female	179.50	168.73	157.96

Rearrange your office without the bother of adding a new coaxial line. Simply install a coaxial multiplexer on each end of the existing line and you're ready to tie in the additional terminal or printer. The converters are maintenance free and no external power is required. Two units required, one on each end of the coaxial line.





Twinaxial Baluns - Cut Cabling Cost by Interconnecting with Modular Wiring					
CTX-11	Twinax, Male	RJ-11 (6 x 6)	34, 36, & 38	74.00	69.56	65.12
CTX-45	Twinax, Male	RJ-45	34, 36, & 38	74.00	69.56	65.12

Very similar to the BNC versions described above, except with a twinaxial connector for use with IBM Systems 34, 36, & 38. Your choice of modular termination, but each unit also has screw terminals for discrete twisted pair wiring or cabling through. Operates within distances up to 1000 ft. without degradation in performance. Use in pairs, one on each end of the line.



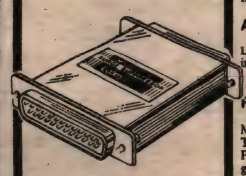
Additional Information of Interest - Wiring of Commercial Telephone Systems

The Coax Eliminator System simply utilizes your existing unused telephone wiring. Since deregulation, the wiring in the building is generally owned by the building proprietor and may be privately maintained. Wiring used should be AWG-22 or 24 gauge and must go through a point-to-point circuit within the property. If you want to use the existing telephone wiring, chances are that spare lines are already available. To find out, simply remove the plate on your phone jack and count the number of wires. Only one extra pair is needed to complete the assembly.

Most single line touch or pulse phones need one pair. Rotary or dial phones need two pairs, while phones with extra function keys may require six or more wires. In any case, the eight-wire twisted pair which is commonly installed provides at least one unused pair of wires. If extra wires are not readily available, a seperate twisted pair will provide more flexibility and greater cost savings than a newly installed coaxial cable.

Accessory Cables - Readily Available From Stock For Immediate Delivery

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Cornerman continued from page 57

The program comes in MichTron's familiar box, with a single unprotected disk and a small manual consisting of two dozen pages. This manual has punched holes for inclusion in your Sanyo manual, if you wish (I never so wish, but others might like to do so), and a single unprotected disk. The disk is single-sided and formatted 8 sectors per track (160K disk) for maximum compatibility, so that users who have not upgraded to double-sided drives can use the software. Backups can be made via the DISKCOPY or COPY commands, and MichTron has for novies the usual information about such matters as copying on systems with only one drive, use of a program with color vs. monochrome monitors, and other friendly features that hand-hold enough to make calls for help unnecessary.

To begin, use the modification/configuration program to adjust Cornerman to your system. You can adjust various parameters relating to your Hayes-compatible modem, form for time display (12 hour vs. 24 hour format), and location of the window for Cornerman. If you have seen Sidekick, you are familiar with the window concept. Touch a certain key combination and a Cornerman window opens. Since the program is in machine language, execution is fast. Personally, I found the window a mite small on my Taxan high-resolution monochrome amber monitor, but decent-sized on my Panasonic 1300 medium-resolution RGB color monitor.

The graphic effects are nominal, but attractive, as is the color, yet nothing spectacular. In fact, the disk contains a demo program in BASIC with colors more exciting than those of the program itself. Why didn't the author, J. Weaver Jr., and MichTron put that extra effort into the program instead?

To run C-Man, type C-Man from DOS with a copy of the program in the logged drive. A small logo appears as it loads, and C-Man is ready for activation via the Shift and Tab keys. (The tab key is the key just above the CTRL key, with the arrows pointing left and right.) From DOS, touch the Break key. Doing so pops up the window, and the menu is pretty much self-explanatory. Invoking a choice leads to a submenu within the window. To leave your choice use the ESCape key, which returns you to the original menu. The applications have a cutesy kind of scroll simulating the motion of page-turning, a metaphor used in the documentation.

I particularly found the calendar and the calculator useful. One fault I find with most of these calculator programs is pedagogical. At the risk of being a wet rag, let me raise a minor objection about such calculator programs: they reinforce a "run-on" mentality and undermine what we mathematics professors try to teach our students about the order of operations. Thus, "3 + 2x4" could be considered as the sum of 3 and 2, which is 5, all times 4, to get 20 (wrong), or 3 plus the product of 2 by 4, which is to say 3 + 8 = 11 (correct). Working with a calculator program forces you to enter in the order of the operations. Hence, you would give (3 + 2) all times 4 if you entered a 3, then a +, then a 2, then a x, then a 4. It may sound petty, but with the way people can hardly calculate any more, I hardly relish anything which reinforces their confusion.

Almost all calculator programs fail to allow for parentheses, but operate on a left-to-right FIFO (first in, first out) format. So this is no indictment of MichTron, Borland, or the other culprits. If you are acclimated to such thinking, you will find MichTron's implementation quite satisfactory, and replete with conversion to another three bases (binary, octal, hexadecimal). You can also "save" your last value in a special buffer to dump into

continued on page 133

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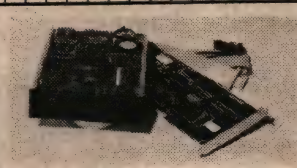
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Commodore Mailbag continued from page 115

hours. It must have taken me 16 hours to do the same with my 1525.

So, the lesson is clear . . . DO NOT use stick-on labels in your 1515, 1525, or 801 printer! Unless, you want to risk getting one stuck inside the printer. If you get one stuck, plan on spending a few hours taking the printer apart, getting the label out, and then (the really hard part) getting your printer back in proper adjustment. Having a SAMS Computerfact manual might help, if you ever have to face this task. They are now available for the 1525, 1526, and 801.

Unusual RF Modulator Problems

Q. ". . .three weeks ago, I bought a green monitor, NEC brand . . . and made my own cable to connect the video signal from C-64 using pin 1 and 2 which works fine . . . after 3 days I wanted to try a game using my color TV, but I cannot get the usual C-64 screen, instead there is a lot of horizontal lines .

M. A. Sutandar
Jarkarta, Indonesia

A. This letter, from one of our overseas readers, really surprised me. It never ceases to amaze me to see how far away copies of the *Computer Shopper* seems to end up! As for the problem Mr. Sutandar is facing, I'll just have to make an educated guess. Since his letter states that he is still getting video directly from the VIC-II chip via pins #1 and #4, it does appear that his problem is in the modulator section of his C-64. But his description of the picture he is getting on his color TV set suggests something else.

I would recommend to him, (and anyone else that has had this problem), to make sure that the RF modulator channel switch is in the correct position for the channel he is tuned to on his TV set. I know that that is an elementary thing to check, but many times I have found after rumaging around the back of the computer, that the switch has gotten bumped to another channel. If the RF modulator is set for channel 4 and the TV is set for channel 3, then you will not see a picture (most likely), but a series of herringbone patterns. I would double check your modulator and TV setting before going any farther. If you are sure everything is OK with those settings, the, there is a possibility that the RF modulator is bad. But I would check to make sure the channel switch on the modulator itself, isn't defective first. ●

Probots and People continued from page 116

would spend $49.95 for "LIFE LITES--Gemini's heartbeat! Located in its chest, just like ours. Hours of enjoyment." I can't see myself spending hours watching a $50 pulsating light go on and off, but maybe I'm different from most people. I might find the $84.95 barometer a little more intriguing.

I do see a big future for personal robots — eventually bigger than that of personal computers. But in my opinion, there is no future in today's big robots. They are overpriced, underpowered, and have no practical value in the home or business environment. There is a word popular among computer engineers that would best describe each of them — "kludge," something that's been thrown together to represent what you would like to eventually build.

Something valuable can be learned from each one of these robots, but most of them have been disastrous financially for the companies that built them. And this fact has scared away potential investors and participants in the field of personal robotics.

I have faith that the personal robot will recover. The incredible popularity of robot toys, the industrial robots whose prices are falling, and the tinkerers and hobbyists working with electronic robot kits and their own inventions will merge to create the true personal robot that is useful, reasonably priced, and popular. That is a machine that I, along with many other people, look forward to with great anticipation. ●

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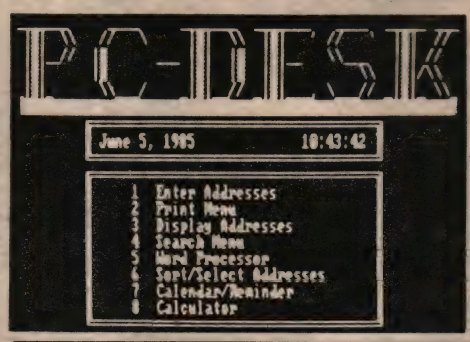
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Ask The Guru
continued from page 47

But stay tuned.

The beauty of being more or less Apple compatible is that the full resources of the Apple become available for your design, debug, and testing of what you want to do. No costly ROM masks or emulation software is needed, and the whole design process gets fast and fun by using standard assemblers, debuggers, printers, disk drives, and so on.

An obvious thing to do is combine the VIP peripheral card we looked at last month with this exciting new chip.

You'll find lots of information on programming 6502 style chips such as the M50734 in my two *Micro Cookbooks* (SAMS #21828 and 21829).

I've got a contest going on this chip in my **Hardware Hacker** column in *Modern Electronics*, so I'll let you in on the fun as well. A free *SAMS* book to the best ten uses for M50734. The overall winner gets an all expense paid tinaja quest for two (FOB Thatcher, Arizona).

Any further details on Apple's new RAM expansion card?

I've only played with this new memory expansion card for a week or two, and I am convinced it is far and away the best route to adding extra memory to your Apple IIe or Apple IIc.

Let's get some of the gotchas out of the way right off. There are at least nine bugs in the 2732 firmware on the card. Locations $C15E, $C25E, . . .and $C75E should all be CPY $C0 rather than CMP $C9 commands. Fortunately, these are only needed to trap an input error that the operating system should also have previously gotten rid of.

The error at $CFF2 is so embarrasing that we cannot even talk about it in a family magazine like ***Computer Shopper.***

There are two extremely important use rules. The addresses must be set in low byte, mid byte, high byte order to prevent overflows from trashing the address bytes you have already set. And the data word access must be done with absolute addressing. Since the data access auto-increments the addresses, indexed addressing or indirect indexed addressing will move you along by two memory locations, due to a double access.

Note that this double whapped indexed access applies both to the 6502 and 65C02, but does so for different reasons.

One surprise is that the Ramcard does not significantly speed up any Applewriter file access. As timing examples, a 25K textfile takes 16 seconds to read from disk and 10 seconds from the Ramcard.

The reason for this is that **Applewriter** reads files one block at a time so that its internal powerful searching delimiters can be used to retrieve portions of a file.

For a 25K textfile, a total of fifty ProDOS calls are needed, each of which grabs one 512 character block.

At any rate, I've just put together a complete disassembly script and source code capturer for this card, along with some utility routines. Included are full secrets of how the card is initialized for all of the DOS, ProDOS, Pascal, and Protocol Converter operating systems. Included also are details on how to safely and selectively reserve memory areas for your own use.

```
-- HIGH-LEVEL ENTRY --
$C500 - Initialize Ramcard
$C50A - Memory test entry point
$C551 - ProDOS device driver entry
$C54E - Protocol converter entry
$C5DB - DOS RWTS entry
$C5F7 - Turn on card ROM
$CFFF - Turn off card ROM

-- MID LEVEL ENTRY --
$C800 - Command interpreter
$C8F9 - Read RAM block
$C964 - Write RAM lock
$CAB2 - Find installed RAM
$CAEF - Format Ramcard as diskette
$CCF0 - Memory test routines

-- LOW LEVEL ENTRY --
$C0C0 - Address low byte
$C0C1 - Address mid byte
$C0C2 - Address high byte
$C0C3 - Data read/write
```

Figure One - Here's the entry points to Apple's Ramcard. Slot 5 values are shown.

Figure one gives you a preview of some of the legal and not so legal entry points to this card.

Write or call if you are interested in a fresh copy of this new script.

Why does [Q]-C foul up a WPL program?

In Applewriter, when you

continued on page 122

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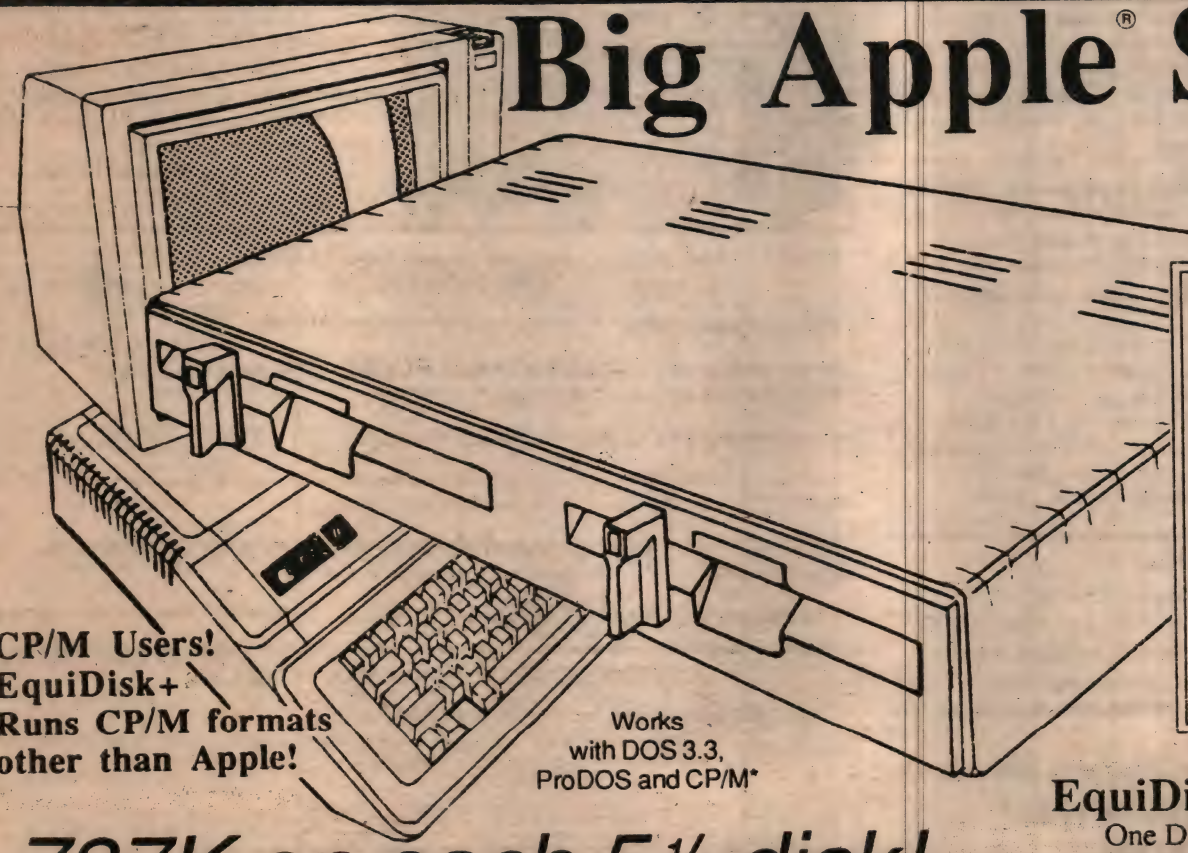
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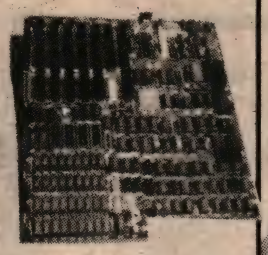
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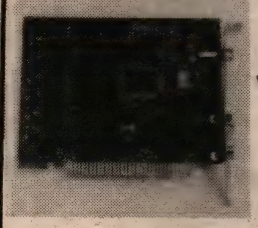
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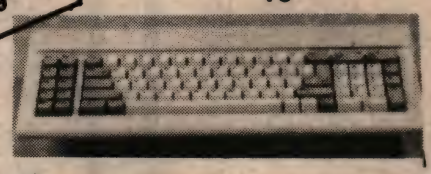
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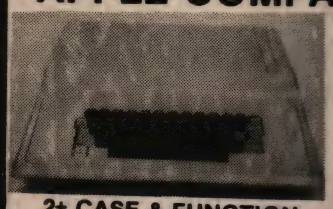
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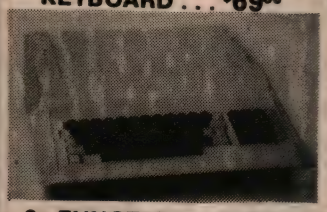
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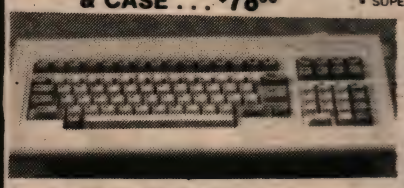
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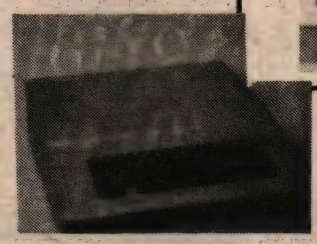


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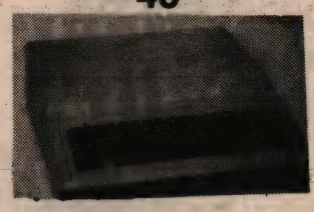


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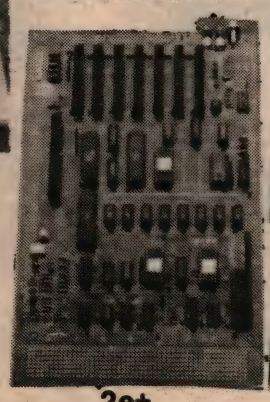
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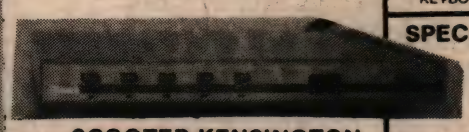
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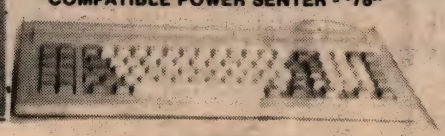
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Ask The Guru
continued from page 120

are running a WPL program, an attempt to load new print constants with the [Q]-C option will, of course, load new print constants. Included in those constants are new values for the WPL variables (x), (y), and (z). If any current use is being made of these numeric variables by the WPL program, bizarre and unpredictable things will happen.

One cure is to save crucial (x), (y), or (z) values to the $AD string variables, and then restore them after the new constants are loaded. A second cure is to hand load each print constant from within WPL.

I've got a few new Applewriter patches almost ready, some mine, some by others. These include an undelete, real time clock access, and more WPL variables. More on these next time.

I hope.

What are the bugs in the Laserwriter Plus?

As with any major upgrade in any computer system or peripheral, the Laserwriter Plus Version 38 ROM's have a few bugs in them that did not come out of the woodwork until users started exercising the machine in ways unexpected by the programmers.

The good news is that the worst two bugs are easily fixed with a single "workaround" paragraph that you can add to the start of your files. The bad news is that one of the bugs affects the most used command and the other one simulates a major paper path failure. After doing a two day complete printer overhaul, it sure had me fooled.

The first bug involves the **copypage** command. There are lots of times when you like to print a copy and then go on and make some changes and then reprint some of the old image mixed in with the new. For instance, the fast way to do a form letter is to put the entire letter into the Laserwriter and then erase and change only the name and address for each successive letter. Yet another major use of **copypage** is as a debugging tool when it is used as a breakpoint. A "broken" copypage routine can introduce more bugs than it can find.

The second bug involves prefeeding. To speed things up, the new Laserwriter plus looks ahead of where it is processing and starts feeding paper before it is really needed. For 95 percent of the time, the paper motion is complete. For another 3 percent of the time, there is a slight delay of a few seconds. But for the remaining two percent of the time, the machine just sits there spinning its wheels and running its laser and making strange noises, for as long as five minutes.

```
% plusbugfix
%.......

% repairs copypage and prefeed bugs.
% insert at beginning of textfile.

/intendcopypage { gsave initgraphics 100
100 translate 1 1 true [ 1 0 0 1 0 0 ]
{<00>} imagemask grestore} def

/copypage {systemdict /copypage get exec
intendcopypage} def

intendcopypage

%.......
```

Figure Two - This "workaround" will bypass two serious Laserwriter Plus bugs.

Figure two shows the workaround that fixes both problems. Simply put this routine at the beginning of your **Postscript** code any time you want to use copypage for repeat imaging or any time you get the "stuck in the snow" wheel spinning.

It probably is **not** a good idea to use this patch all the time as it slows things down somewhat and only adds to your program length.

There is also apparently a third bug that involves a fatal limit check on the frame device buffer. This one is way out of the mainstream and so far has not been pinned down.

By the way, the new Laserwriter Plus has the following differences over the original machine: The amount of ROM has been doubled by going to double sized chips. There are some exciting and useful new built-in fonts.

Operation is now slightly faster when using an Apple IIe and considerably faster when using a Macintosh. However, the apparent speed of a IIe remains faster than that of a Mac when running most typical applications.

In addition to the previous ability to download low cost, unprotected, and unlicensed user defined fonts from any source, the new machine also offers a special feature to download from a single source of expensive, protected, and strictly site licensed fonts.

How can I draw an electronic schematic?

Why, with Applewriter on an Apple IIe of course. How

continued on page 125

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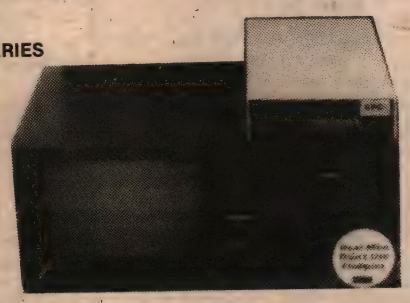
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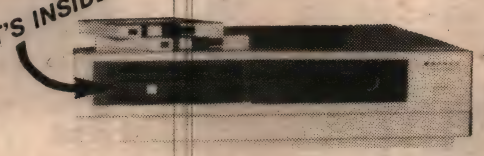
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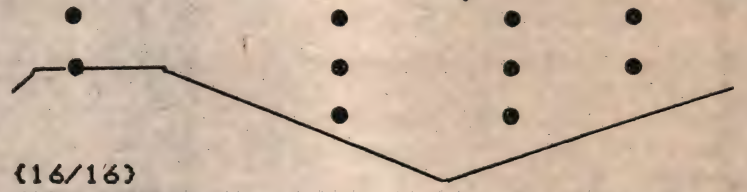
AppleWorks Find-A-File continued from page 47

doesn't need to be seen as it is read. After each entry is read, the number of files is incremented. Line 230 returns to line 190. Thus, the program will eventually run out of information stored in the directory and will produce an "OUT OF DATA" error.

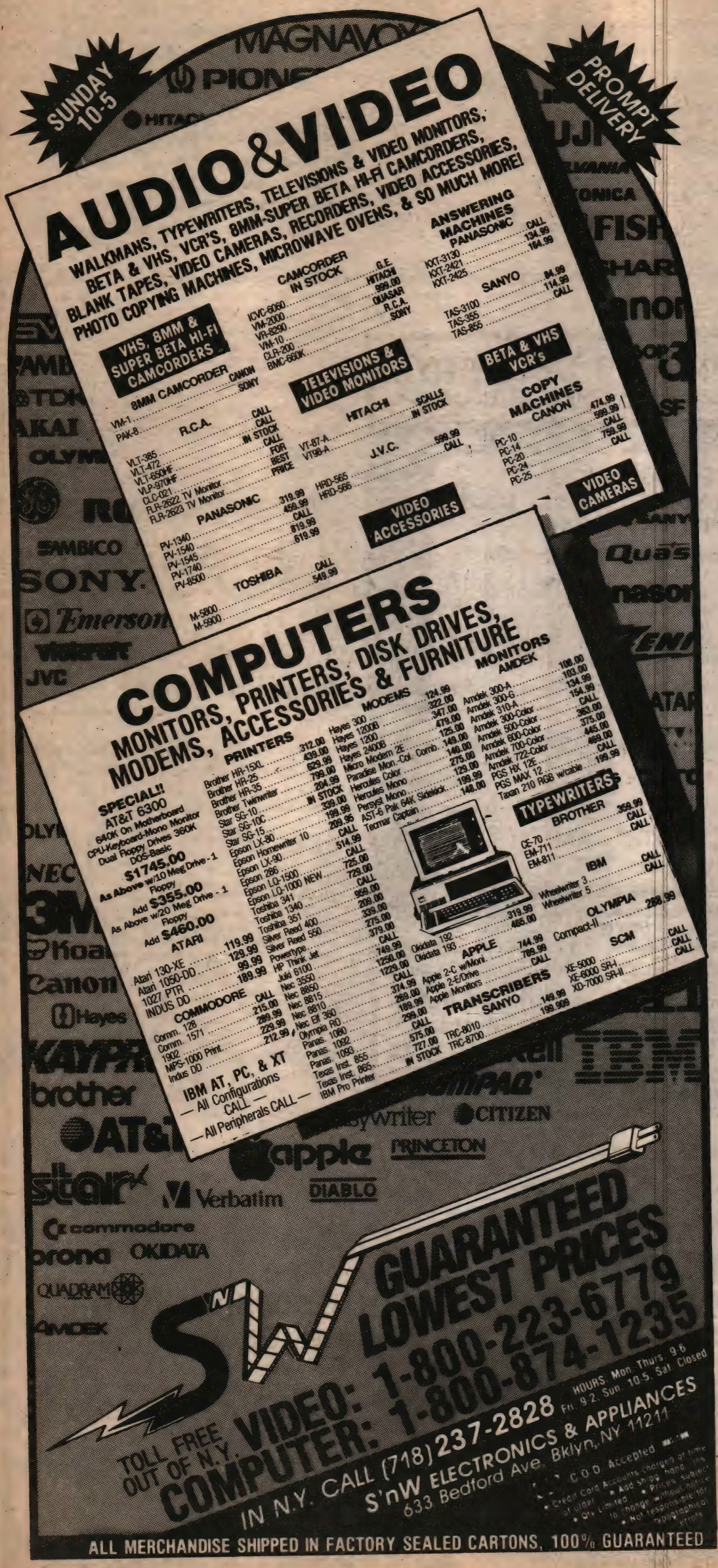
The ONERR routine at 2000 picks up the pieces. It places the number of files in the directory (really the number of entries read) into the "T" array, CLOSEs the directory, pauses (another candidate for elimination), turns off the error

continued on page 125

```
(1/16)
/ADM
 NAME                 TYPE   BLOCKS   MODIFIED
 RATE.SHEET           AWP         6   16-AUG-85
 ADDRESSES            ADB         8   16-AUG-85
 PONUMBERS            ADB         5   16-AUG-85
 RECALL.REFS          AWP         5   19-AUG-85
 ADDRESSESL           ADB         9   16-AUG-85
 PHONE2               ADB        13   30-OCT-85
 A.ADDR               AWP         1   16-AUG-85
 A07105.APPWRKPH      AWP        18   20-AUG-85
 INHOME.ADDR          AWP         1   16-AUG-85
 ADDRESSESF           ADB         7   16-AUG-85
 CT.READER3           BAS         3   19-AUG-85
 ADDRESSES.2          ADB        10    4-NOV-85
(2/16)
/RESUMES
 NAME                 TYPE   BLOCKS   MODIFIED
 LEWI                 AWP         9   16-AUG-85
 MC                   AWP         7   16-AUG-85
 M                    AWP         8   16-AUG-85
                      AWP         4   16-AUG-
                      AWP         4   1-
                                  5
                                  4
```



```
(16/16)
/ADM.FORMS
 NAME                 TYPE   BLOCKS   MODIFIED
 CASH.RECIEPT         AWP         3   16-AUG-85
 TIME.SHEET           AWP         4   16-AUG-85
 TASK.LIST            ADB        10   16-AUG-85
 TIME.CARD            ASP         3   16-AUG-85
 PO.FORM1             AWP         1   26-SEP-85
 E.PLANERS            ADB        37   16-AUG-85
 PO.PE507241          AWP         3   26-SEP-85
 PONUMBERS            ADB         5   26-SEP-85
 TELECON              AWP         3   29-OCT-85
BLOCKS FREE:  204      BLOCKS USED:  76
( END )
```

Ask The Guru
continued from page 122

else could you possibly draw an electronic schematic?

The images quality and flexibility ends up vastly better than anything that's currently available from any screen oriented graphics routine on any microcomputer. This happens because an exact text description is far and away the most powerful, most flexible, and most exact way of wringing the ultimate performance out of the Laserwriter.

By the strangest of coincidences, I've put together an electronic schematic package that is a small part of my Applewriter/Laserwriter Utility package. What I would like to do here is share with you some of the key secrets and show you how its done.

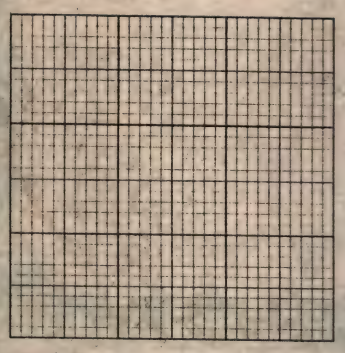


Figure Three - To draw an Applewriter schematic, start with a gray rubber grid . . .

As figure three shows us, you start out with a gray rubber grid that lets you stretch or squash the drawing to the size you need. Normally, one unit of the grid is defined as the space betwen adjacent pins on an integrated circuit package. You can turn the grid on and off as needed.

Unlike screen graphics grids, you can easily use fractional grid values. No matter how fine the grid or how nervous the programmer, horizontal

continued on page 128

AppleWorks Find-A-File
continued from page 124

flag, and returns to the main part of the program.

This inelegant use of ONERR could be eliminated by trapping the BLOCKS FREE message, but I'm lazy and this works O.K.

If the question of another catalog is answered "N," lines 1080 through 1200 are executed. This section of the program writes the catalog information to a text file. Line 1090 asks for the path name. Instead of supplying the leading slash, line 1100 informs that the full path name must be used and returns you to line 1090.

A file is then opened on the named disk for a file terminated by the suffix ".CLOG." Note that no error checking is done, and an error here closes the file and returns you to the main part of the program (crude but effective). All file information (entries) for each catalog are then printed to the new file. Headers are provided for each listing, and the entire list is terminated by the word "END."Line 1200 contains an END statement that terminates the program.

There are several possible improvements in addition to those I've mentioned above. After I wrote this program and had it working, I decided to leave well enough alone. You may have other needs or ideas about how to customize this program just for you. One of my associates decided he wanted to modify it so that it looked only for BASIC programs. It took him all of twenty minutes. There are many good ideas that Apple left out of their good idea--perhaps *you'll* think of some! ●

```
list

10  DIM A$(20,50),T(20): REM  MAKE ROOM FOR THE ARRAYS
20  GOTO 1000: REM  START WITH MAIN
100  REM   READ THE DIRECTORY ROUTINE ************************************
105  PRINT "INSERT NEXT DISK IN DRIVE"
110  INPUT "DISK NAME ";N$: REM  NAME OF DIRECTORY
120  IF  LEFT$ (N$,1) <  > "/" THEN N$ = "/" + N$: REM  ASSURE START OF DIRECTORY
140 NC = NC + 1: REM  INCRIMENT NUMBER OF CATALOGS
150 NF = 0: REM  SET NUMBER OF FILES TO ZERO
160  ONERR  GOTO 2000: REM  TO TRAP FOR END OF FILE
170  PRINT D$"OPEN "N$;",TDIR": REM  OPEN A DIRECTORY FILE
180  PRINT D$"READ "N$: REM  READ THE FILE (CAN'T WRITE TO A DIRECTORY FILE)
190  INPUT A$: REM  READ EACH LINE OF DIRECTORY
200 A$(NC,NF) =  LEFT$ (A$,39): REM  STORE ONLY 40 CHARACTERS, YOU CAN CHANGE THIS
210  PRINT A$(NC,NF): REM  JUST FOR SHOW PUT EACH LINE ON THE SCREEN
220 NF = NF + 1: REM  INCRIMENT THE NUMBER OF FILES
230  GOTO 190: REM  GET THE NEXT LINE FROM DIRECTORY
1000  REM   MAIN ROUTINE ***************************************************
1010 D$ =  CHR$ (4): REM  JUST TO MAKE LINES SHORTER
1020  HOME : REM  CLEAR THE SCREEN
1040  VTAB 3: PRINT NC,T(NC),NF: REM  SO WE CAN KEEP TRACK OF HOW MANY WE;VE DONE
1050  PRINT "CATALOG ANOTHER ";NC;" DISK (Y/N)";: INPUT A$
1060  IF A$ <  > "Y" AND A$ <  > "N" THEN 1000: REM  IT MUST BE Y OR N
1070  IF A$ = "Y" THEN 100: REM   IF IT'S Y THEN WE READ ANOTHER DISK DIRECTORY
1080  REM   IT WAS N SO, WRITE OUT THE INFO
1090  INPUT "DATA DISK PATH NAME";PN$: REM  THE COMPLETE PATH OF WHERE THE DATA GOES
1100  IF  LEFT$ (PN$,1) <  > "/" THEN  PRINT "YOU MUST ENTER FULL PATH NAME!": GOTO 1090
1110  PRINT D$"OPEN ";PN$".CLOG": REM THE DATA TEXT FILE ENDS IN .CLOG TO BE UNIQUE
1120  PRINT D$"WRITE";PN$".CLOG": REM  WE'VE GOT TO LET IT KNOW WE'RE WRITING
1130  FOR I = 1 TO NC: REM ALL DIRECTORIES
1140  PRINT : PRINT "("I"/"NC")": PRINT : REM  HEADER FOR EACH CATALOG LISTING
1150  FOR K = 0 TO T(NC): REM  ALL FILES IN EACH DIRECTORY
1160  PRINT A$(I,K): REM  PRINT EACH ELEMENT OF THE DATA ARRAY
1170  NEXT K,I
1180  PRINT : PRINT "( END )": PRINT : REM  NOTE END OF ALL LISTINGS
1190  PRINT D$"CLOSE";PN$".CLOG"
1200  END : REM  THAT'S ALL FOLKS ******************************************
2000  REM   ERROR ROUTINE er er er er er er er er er er er er er er er er
2010 T(NC) = NF: REM  STORE TOTAL NUMBER OF FILES FOR CATALOG NC
2020  PRINT D$"CLOSE "N$: REM  CLOSE THE DIRECTORY FILE ON ANY ERROR
2030  FOR K = 1 TO 1000: NEXT K: REM  JUST SO WE CAN SEE THE CATALOG
2040  POKE 216,0: REM  TURN OFF ONERR
2050  GOTO 1000: REM  RETURN TO MAIN - MUST USE GOTO BECAUSE OF APPLESOFT
```


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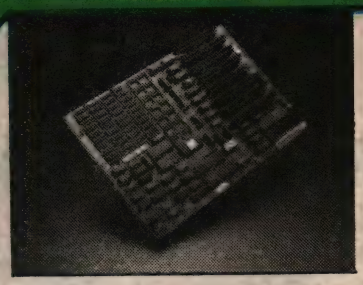
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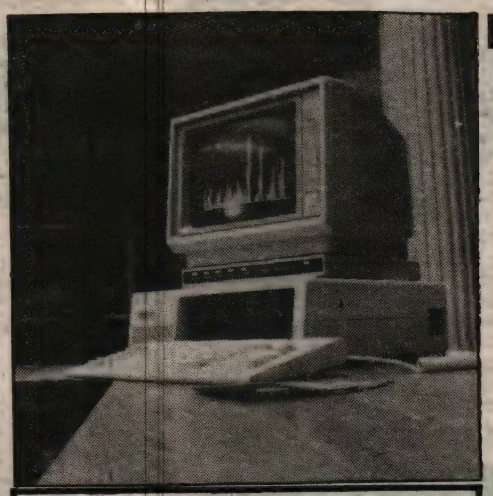
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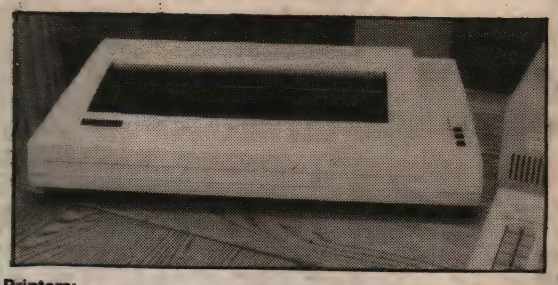
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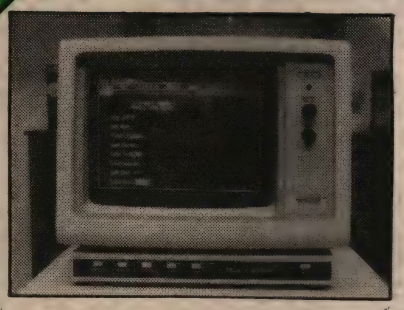
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Ask The Guru
continued from page 125

and vertical lines always stay that way.

Unfortunately, we learned a few columns back that the ***Computer Shopper*** printing press cannot be trusted with gray halftones, so we will drop the grid from the rest of the figures. Normally, you keep the grid until your final copy.

Next, as figure four shows us, we put down some **opaque symbols.** A symbol can be something like a resistor or an integrated circuit or an inverter.

Whenever these symbols are put down, they erase and then overwrite whatever happens to be under them.

Thus, you could put down one **continuous** wire first, and then drop a resistor on top of it. This is far faster and far easier than worrying about exactly where each connection to each part of each symbol has to go. Symbols can later be slid along a wire for best appearance.

The symbols all use **action points.** Rather than define the position of a symbol from its corners, you define it from a logical connection point instead.

The action point of a resistor would be its center. The action point of an integrated circuit pictorial is the center of pin number one, and so on.

Some of the symbols use of an **automated DIP pictorial generator.** To draw a complex 40 pin integrated circuit, you use a special routine. All you have to tell this routine is the number of pins, the name of the chip, and two strings of callouts as needed for the top and bottom pin rows. Thus, an entire DIP pictorial is drawn with a few dozen keystrokes!

Complement bars are easily added when and as needed with a companion routine.

Symbols can be simple or complex. To show a resistance omega, you just type the word **ohms.** To show a capacitance mu, you just type the word **micro** and so on.

Things like arrowheads, clock pulses, and connection dots are similarly handled. You do not have to define these in the textfile for a particular schematic; they are already predefined in the preloaded schematic utility routines.

Next, as in figure five, comes **slide-under wiring.** Since the symbols are all opaque, they will position themselves on top of any wires and will completely erase any wire under them. By putting the wire descriptions **early** in the textfile and the symbols **late** in the textfile, all of the wires will magically

continued on page 130

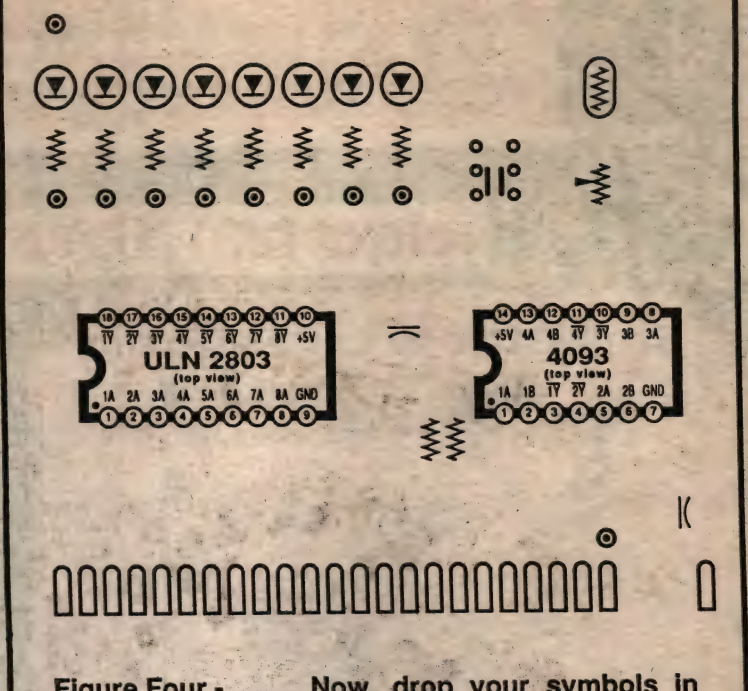


Figure Four - . . . Now, drop your symbols in place where you want them.

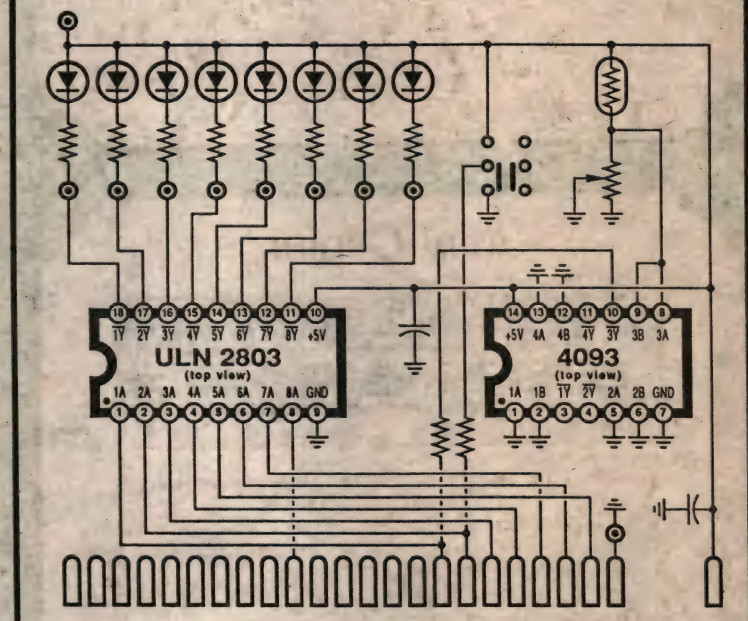
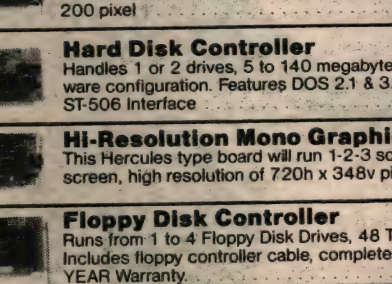


Figure Five - . . . Next, slide the wiring under the symbols. Note the breaks.

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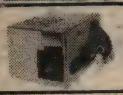
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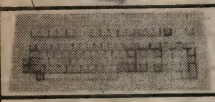
System Components



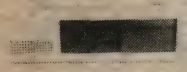
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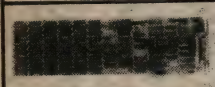
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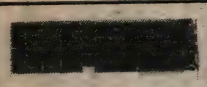
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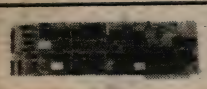
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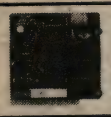
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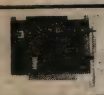
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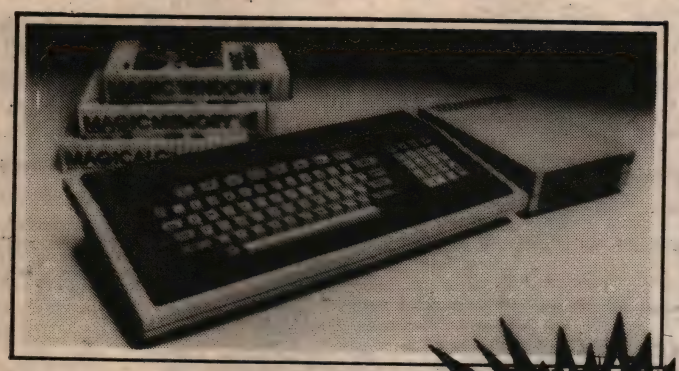
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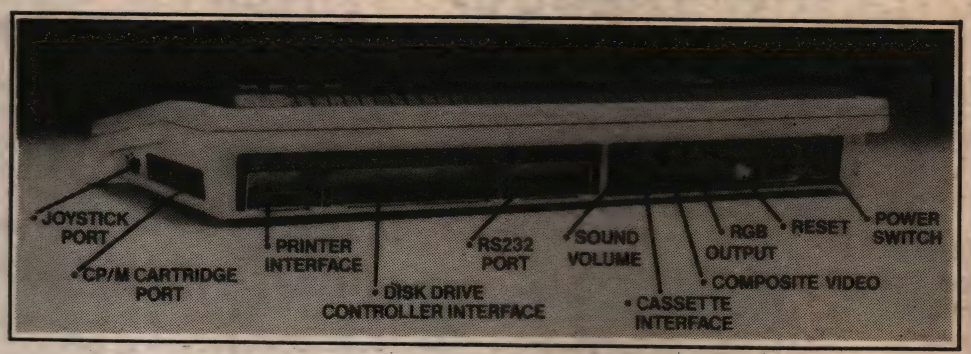
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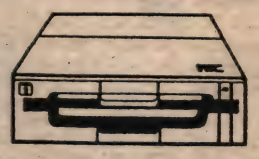
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Ask The Guru
continued from page 128

stop at the exact edge of each symbol. Usually, you put your symbols down first, and then slide the wires under them.

This mind-boggling trick is done simply by entering wire descriptions above the symbol callouts in your textfile, but while entering the wires after you enter the symbols.

Note the use of self-breaking wires. Observe the white space every time a vertical wire ducks under a horizontal one. This gets handled automatically by drawing a fat white horizontal wire and then redrawing a thin black horizontal wire on top of the white one.

Special adjustments are made to keep from erasing portions of the wire endpoints. You can pick no breaks, vertical breaks, or horizontal breaks per your drawing style.

Finally, lettering and callouts are added to get the final result shown in figure six. Note that any font of any size can be used, and that you are free to stretch or squash the font either vertically or horizontally.

If the "slight rattiness" of this final image is not good enough for you, a single phone call to someone with a Linotron 300 will instantly upgrade the image to a 2650 dot per inch resolution.

Yes, these same ideas will work very well for quick and simple printed circuit layouts. More on this some other time.

I'd be most happy to send you some free sample listings of these utility routines, along with a few mind-boggling demos.

Just call or write.

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continued on page 132

TRAINER I/O INTERFACE

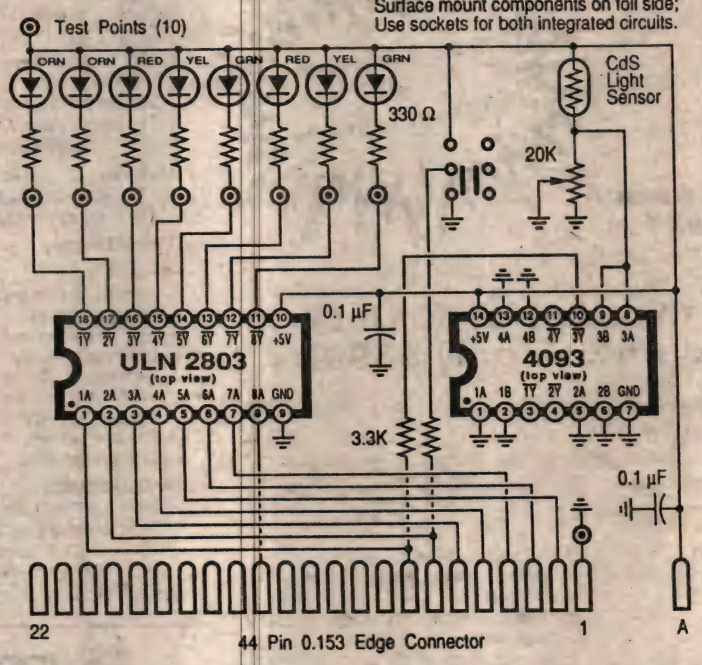


Figure Six - . . . Then add the lettering to complete the final schematic.

The Observatory
continued from page 48

program will "move" the sky, your location on Earth, or the time. (It is difficult to see the North Star from the South Pole or to see the sun at night.

And you can zoom in on an interesting portion of the sky to take a closer look. A constellation can be magnified to fill the sky. Most objects are too far away to be magnified into anything more than dots of light. Jupiter will magnify large enough to show its four major moons in orbit. The sun and moon will turn into circles if you magnify them enough, and you can watch objects pass in front of magnified views.

The program's database includes over 400 stars, the major planets, Halley's comet, the sun, moon, the Galilean moons (the four major moons of Jupiter--Io, Europa, Ganymede, and Callisto, discovered by Galileo Galliei, and photographed by the Voyager spacecrafts), and dozens of novae, clusters, and galaxies. Most visible stars are listed, but many small stars have been left out, including three of my favorites: Epislon Eridani, Barnard's star, and Eta Carinae.

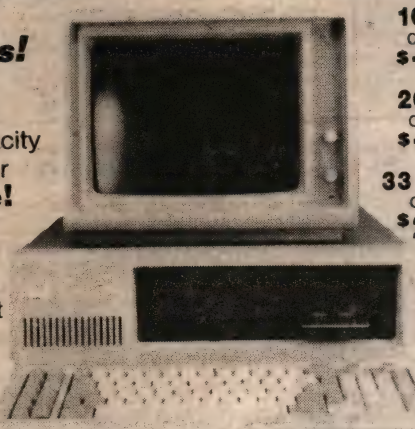
If you purchase "Observatory" I would recommend that you treat your program diskette with extra special care. The program is copy protected, and requires that you leave the write-protect tab open, since it writes the location (latitude and longitude) and time to the diskette.

Although the program is totally locked, I did find a relatively simple way to dump the pictures of the sky. Set up the sky exactly the way you want it to appear on the print out. Exit the program with the CTRL-Y command. The

continued on page 136

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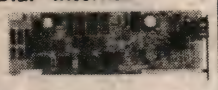
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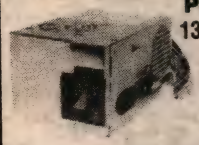
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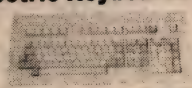
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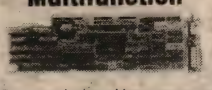
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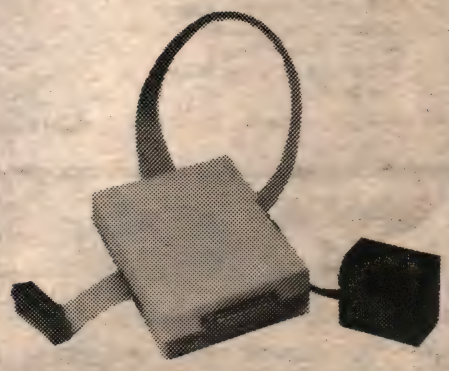
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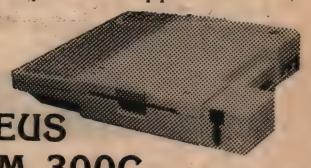
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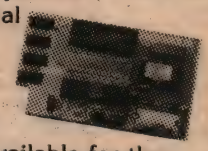
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CP/M On The Apple IIc
continued from page 48

limit is 64K and has up to 5 meg of disk space.

Z-80c will give you CP/M capabilities, but Z-RAM will give you much more. Up to 512K of RAM can be banked in and out of memory with Z-RAM. The memory can be accessed with the proper software from CP/M. ProDOS, Pascal, and DOS 3.3. Applications programs can also use the extra memory. AE supplies the user with ramdrive programs for all four operating systems, so the Z-RAM memory can be used as a solid state disk drive. If you only have one drive in your IIc or carry your IIc around, this memory will save you a lot of work. Diskettes can be copied in one pass--instead of four.

Z-RAM comes with its own Appleworks expander. With a 512K Z-RAM, the Appleworks desktop is expanded to 413K. Not bad, but there is more.

Any user who has tried to operate Appleworks on the IIc has encountered a major problem. Where most IIes come with two disk drives, most IIc owners have only one drive. Since Appleworks is too large to fit in memory, its program modules must be loaded from the PROGRAM diskette. If you have two drives, then the PROGRAM diskette can be in one drive, and your DATA diskette can be in the other. But if you have only one drive, then you must swap diskettes whenever Appleworks needs to load a different module.

Granted, external IIc drives are available. But, if you carry around your IIc (so that's what that handle is for), also carrying a second drive also is a nuisance (as well as extra drain on your battery pack, if you use one).

The simple solution with Z-RAM is to use a combination of the different memory expansion techniques. Use part of your Z-RAM as a ramdrive and will use the rest for memory expansion. When you boot the enhanced Appleworks, it will load the entire PROGRAM diskette into the ramdrive and will use the rest of the memory to expand the desktop. This option is also provided with the Appleworks expansion program, and it actually makes Appleworks practical on a single drive system. Although Appleworks takes another two minutes to load (to read everything into memory and to put it into the ramdrive), once it loads it's much faster than normal Appleworks since it loads the program modules from the ramdrive instead of from the diskette. If you are using your IIc with a battery pack, you'll also appreciate the fact that the RAM uses much less power than disk drive motors.

Applied Engineering is proud of the Z-RAM, and they should be. Their biggest boast is in their product catalog: "So the next time somebody asks you why you didn't get an IBM PC, tell him you bought a IIc because the IBM didn't have enough memory, and was too slow, and couldn't run CP/M software. And tell him you made it past the 8th grade."

If you have a IIc and need more memory, get the Z-RAM. If you need CP/M, but don't need the extra memory, I'd still consider Z-RAM. You may need the memory in the future. But, if you are sure you will **never** need the extra memory, look into the Z-80c.

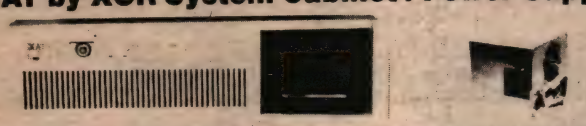
Product: Z-80c, Z-RAM
Manufacturer: Applied Engineering, P.O. Box 798, Carrollton, TX 75006; (214) 241-6060
Price: Z-80c--$159; Z-RAM 256K--$449; Z-RAM 512K--$549
Hardware Needed: Apple IIc
Warranty: 5 years
Summary: Excellent design and construction. If you want CP/M for your Apple IIc, or need extra RAM, here's the way to go. ●

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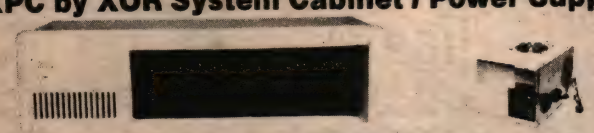
XAT by XOR System Cabinet / Power Supply



Put your AT compatible motherboard in this good-looking **XAT** system cabinet. Key-lock On-Off switching with front panel access to three half-height peripherals. Behind the panel mounting for one or two hard disks. Color/Finish: Grey beige enamel. Dimensions: 6.25" x 21" x 16"
CAB-9068-00 ..... $145.00

A perfect match to the **XAT** cabinet, this 200 watt switching power supply is equipped with four DC power connections to hook-up all those peripherals. One year warranty.
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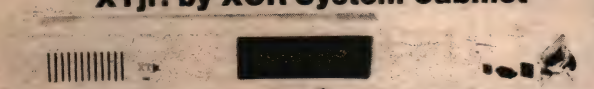
XPC by XOR System Cabinet / Power Supply



Our already famous **XPC-XT** cabinet has an 8-slot back panel with additional cut-outs for two RS-232 I/O ports. Features mounting for up to four half height peripherals, standard slide-off-the-front top piece, solid, molded front bezel, and heavy gauge steel.
CAB-6068-00 ..... $75.00

Choose a 135 watt or a 150 watt power linear power supply with side-mount On-Off switch and quiet DC cooling fan. 115/230 VAC, 50/60 Hz.
135 Watt POW-1040-00 ..... $89.00 150 watt POW-1044-00 ..... $115.00

XTjr. by XOR System Cabinet



The **XTjr.** cabinet is only 3" x 16.5" x 15" yet it will hold a standard XT compatible motherboard. A special extender card BOA-5068-00 is used in the 5th slot to allow up to four add-on boards mounted horizontally in the cabinet. Two additional cut-outs are supplied for serial I/O. The cabinet price includes a switching power supply. Front panel cut-out for a half-height floppy or hard disk. AC switch and AC outlet for monitor on the rear panel.
CAB-5068-00 w/P.S. $135.00

XTC by XOR System Cabinet / Power Supply

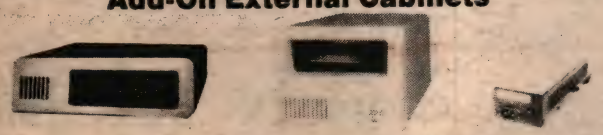




The **XTC** cabinet is perfect for industrial and in an enginnering environment. Hinged door panels on both sides (removeable) allow easy access to components within. Also, a perfect system cabinet for the system integrator wanting to get away from the standard PC look. Front mount AC switch, cut-outs for three half-height peripherals and mounting behind the panel for a full-height hard disk or 1 or 2 half-height hard disks. Will accept mounting of the **XT**, **XTURBO**, and **XBC** motherboards 8-slot rear panel with two additional cutouts for serial I/O.
CAB-7068-00 assembled $99.00

Matching power supply; the switching power supply is a 135 watt unit that mounts in the top rear of the **XTC** cabinet for added cooling capability. Includes four DC power connectors for peripherals. 110/220 VAC, 50/60 Hz.
POW-1045-00 ..... $95.00

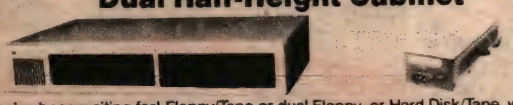
Add-On External Cabinets



Add-on a floppy, tape back-up, or up to 33 meg of hard disk (half-height). The rear panel has a universal AC input outlet, AC switch, and an automatic 110/220 VAC 50/60 Hz switch for easy configuration. Four cut-outs for ribbon cables are also provided. Switching power supply is included with cabinet and comes pre-installed and tested. Color: Grey beige, DC outputs: +5v @ 5.0 amps, +12v @ 1.5 amps.

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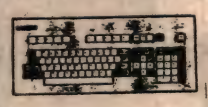


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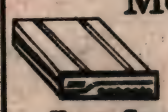
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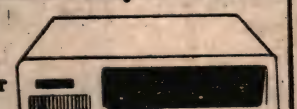


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Cornerman
continued from page 118

your application program. Thus, if you had invoked Cornerman to do a calculation and get the value, you could use C-Man, get the value, and then have it used in your original application program.

The calendar automatically opens to the present month. So I recommend that, if you create an AUTOEXEC.BAT file to load Cornerman, you do not bypass date and time, or fail to include these in that file. Moreover, these are always on display in the window. I did not see any way to store notes or appointments relative to the calendar. While I personally don't use a computer organizer, I might convert to one some day. I do know that many people in the world of MSDOS computing do use such. Thus, the calendar's utility is limited; mostly, you can look ahead or behind a month or year with a touch of a key.

The notepad is cute, but again, limited. The problem here is size. Granted, one is not likely to be writing a novel here, but it's not clear as to the kind of notes people take which are best suited for this form of storage. Perhaps somebody writing a program would like to open up the notepad window and jot down an idea? Hmm, maybe... Anyway, there are 99 pages of storage available, with each page holding about 75 characters. You can read these in your favorite word processor, but I didn't try it myself.

Summary

I found Cornerman fun, but a bit limited. Don't get me wrong; it's a nice little program. And at $39.95, it's reasonably priced. If you frequently find yourself using a Sanyo 550/555 and wishing you could pop up a calculator, produce a calendar of a given month, or have a place to jot down notes that you'd like to keep on disk, Cornerman is worth considering. It will run on just about every Sanyo 550/555, regardless of system specifics. Tell MichTron that you read about it here in the *Computer Shopper*!

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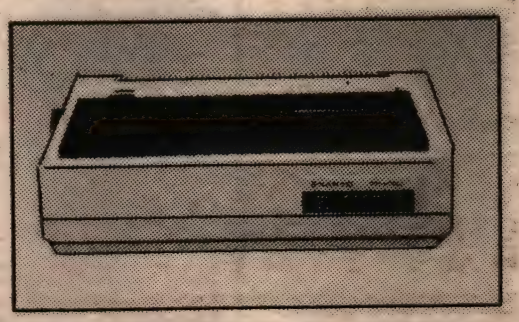
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The Observatory

continued from page 130

screen will display a bunch of "garbage" text (actually the second text screen). Put a HIRES dump program (e.g. Printographer) into the drive and hit CTRL-RESET. Do *not* hit CTRL-OPEN APPLE-RESET or you will erase parts of your picture. When you enter Printographer the picture will be in memory, on the first HIRES page, and you can dump it using the standard Printographer commands. If you have a "smart" interface card (e.g. Uniprint, Microbuffer, Fingerprint, etc.) you can hit CTRL-RESET twice and dump the picture from BASIC using the interface card's built in dump program.

The 49 page manual looks like as if it were designed for an astronomy student. Several descriptions of possible views are included. The sample data shows how to set up the program for several famous examples which are taught in every intermediate level astronomy course, including: aolar and annular eclipses, Galileo's sighting of Neptune, precession of the Earth, and Venus's transit of the sun in 2004.

The manual does need several improvements though. The star chart in the appendix lists the stars in the program, but does not include the stars' common names. Do you know the common name for Alpha Aquila? It's "Altair," the star the space cruiser visited in *Forbidden Planet*. Altair IV is the planet the *Enterprise* was visting in the *Star Trek* episode "Amok Time" and is the star the *Altair* microcomputer was named after.

At the present, the program is available only for the Apple II series. Any Apple with at least 64K of RAM can run the "Observatory." Macintosh and IBM versions are under development.

Overall, the program is powerful and excellent. I don't like its copy protection or that it writes to itself (too much chance of accidentally erasing the diskette). And, the manual should be re written. But overall, I am happy with "Observatory." If you are interested in astronomy, then you will like "Observatory." The program should be considered as important as a text book for any astronomy student.

How To Pronounce "Halley"

"Halley" rhymes with "Valley." The comet is named after Sir Edmund Halley, the English astronomer who first determined that the comet which appeared several times was the same comet returning and not different objects. The Halley that rhymes with "Bailey" was part of the "Bill Haley and the Comets" singing group.

Product: The Observatory
Author: Gary J. Lassiter
Price: $49.95, $10 optional backup disk
Company: Lightspeed Software, 2124 Kittredge Street, Suite 185, Berkley, CA 94704; (415) 486-1165
Hardware Requirements: Any Apple with at least 64K
Warranty: 90 days, $10 replacement charge out of warranty
Summary: Excellent astronomy tool ●

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EquiDisk+

continued from page 48

EquiDisk+ allows the Apple user to reconfigure one EquiDisk+ drive in the TeleVideo format. CP/M software available for TeleVideo computers can then be run directly on the Apple without modification.

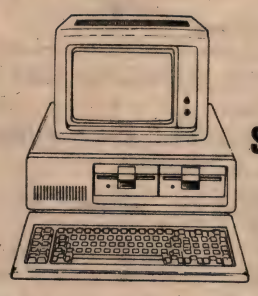
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The EquiDisk+ is designed to work with Apple II+ and IIe computers equipped with 64K of RAM. The user's manual explains, step-by-step, how to install the controller card and the high-capacity drives. The software provides the user with EquiDisk+ start-up, formatting and copy routines.

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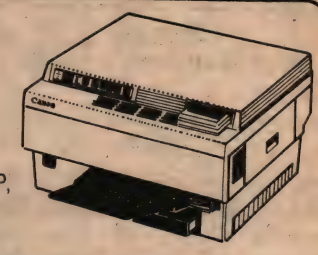
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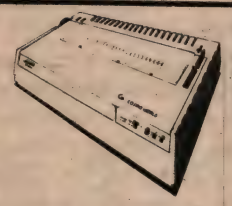
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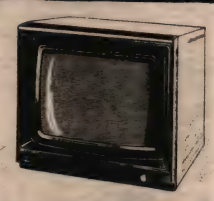
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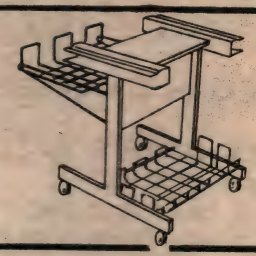
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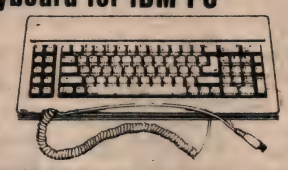
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Silver Box
continued from page 58

operated switch must be installed in the hardware and this may require a little modification of the Sanyo BIOS. Do you know anybody who has the source code for it? In the stock unit the screen is wired to operate in the first 256K of RAM area only. By changing the connection of one grounded select wire to +5V you can shift the CRT Controller, 6845/HD46505SP to access the second 256K segment of RAM, piggyback fashion or by an add-on board. This may not be a big job. You can get 512K, but no further, but I must have 640K.

Or, if you don't care for the 640 X 200 high resolution color capability of the Sanyo screen, you can use the color board and kill the high resolution screen for good. If you so decide, all 640K is available for you. To get this RAM capacity you need 2 X 8 = 16 pieces of 256K chips or 16 pieces of 64K chips and 8 pieces of 256K chips.

I guess I may pull out and disable the on-board CRT Controller for speed. Do you know in Sanyo the CPU is sidetracked when CRT Controller accesses the memory, thus the CPU is allowed to operate only half the time?

The above approach may be the easiest, but the high resolution color display capability of the MBC-555 will be lost forever! I don't know if I will let it happen to my "Silver Box." This is a question hard to answer.

The Ultimate Protection!

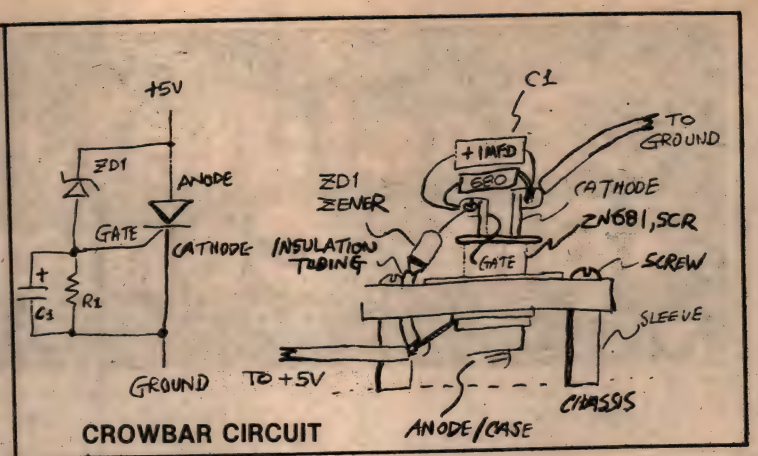
One ex-Sanyo dealer told me that Sanyo has been shipping the expansion board with a new current-limit resistor to bring up the current limit value from 4.0A to 5.0A nominal. I did not know this but the news gave me a hint that I should devise some easy solution for some people who cannot get a large capacity, computer quality power supply.

The solution is as follows. For casual users changing the current limit resistor solves most of problems except the heat problems. This solution, however, introduces slightly elevated chance of power transistor break-down which will result in a catastrophic damage which may not be as firely as that of the space shuttle but which might produce similar impact on your pocket book. To prevent this from happening, I must recommend you to use a crowbar module. Here is how you can make one.

Parts List

(1) Heat Sink: 1.5" x 1.5", 1/4" Thick Aluminum Plate

(2) Solder Lug: For 1/4-28 Screw, 1 Piece



CROWBAR CIRCUIT

(3) Screws: 2 Pieces 8-32 X 1.5 (Heat Sink mounting screws)

(4) Mounting Hardware For 2N681 SCR, 1 Set.

(5) Sleeve: 2 pieces, for #8 Screw, 1" Long, Metal

(6) SCR1: 2N681/2N682 SCR or Equivalent

(7) ZD1: 5V - 5.5V Zener Diode, 0.6 - 1.0W

(8) R1: Resistor, 680 Ohms, 1/2W

(9) C1: Electrolytic, 1 MFD, 15 - 50V

(10) Leads: #16 Insulated Wire, 5 Inches

Construction

(Refer to Figure 1). Mount the SCR in the center of the heat sink with insulating sleeve and mica washer. The edges of the mounting hole must be smooth and round. Do not forget to slip the Soldering Lug under the Nut and in between the metal Flat Washer. Connect the Zener Diode between the SCR Anode and the Gate with banded side to the Anode. Drill a 3/16 hole near the SCR perimeter to put the Zener Diode lead insulated with plastic tubing through it. Next connect the R1 and C1 between the SCR Gate and the SCR Cathode.

All the parts must be carefully dressed so that their bare wires and bare metal corners do not touch each other. The Zener ZD1 and the Capacitor C1 have polarity. You must be very careful not to reverse it. The 2N681 has the Anode (the side to be connected to the 5V line) connected to the case. The 2N681R has reversed connection but the Gate is the same small terminal. The Cathode is the larger terminal on top of the SCR in the 2N681, and in 2N681R it is connected to the SCR case.

Operation Principles

The ZD1 is a 5V zener diode, the SCR1 should be 25 amp SCR such as 2N681 which can be triggered to conduct current directly to ground. By so doing, the offending high voltage can be bypassed to ground. In Sanyo computer, the transformer has a thermal fuse and it may open up to prevent the transformer from burning.

I do not recommend very large SCR (an SCR larger than 25 amps) because they may require a larger gate current than the zener diode may not be able to provide. Unless you know for sure the SCR you are going to use has very sensitive gate and damage to Zener will not happen. You can use any 25A SCR because this will be connected to the 5V line and the minimum value of reverse

continued on page 140

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Silver Box
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voltage is insignificant if it's not damaged or shorted. The commercial minimum voltage rating you can get is 25 volts and this will be suffice. You can buy 2N681 or equivalent in the surplus store or an electronic distributor.

The C1 is used to filter out gliches and short transients which may appear in any digital power line. They produce no harm because of short duration. The SCR has a large capacitance between anode and the gate so you must bypass unwanted signals to the ground. The R1 bypasses the leak current from the Zener and the SCR gate. You must use it, otherwise you may have SCR triggered spontaneously when the temperature is high.

The circuit works like this. When the logic power voltage goes up beyond the 5V rated voltage, some current starts to flow in the zener and this current mostly goes though the resistor R1. The voltage at the gate is usually at 0V if the logic power voltage is about 5V, but if the voltage goes up, the voltage at the Gate will go up at the same step. If the power voltage is 6V, about 1V will appear across the R1. SCR usuallly fires at 1.2V to 1.5V gate voltage. This means that the SCR will be triggered when the power voltage goes up to 6.2V - 6.5V.

This will be fine, since the ICs can tolerate this range of over-voltage for a few seconds. Most ICs will recover from 6.5V supply voltage for 10 seconds or longer, unless it is an LSTTL and one adjacent gate is connected to the 5V power ine and the other is connected directly to the ground. This condition may create gate junction break-down and melt the junction. This is the reason why the manufacturers recommend to connect the unused gate inputs to the 5V line through a 2.2K resistor. The resistor limits the current and prevents the junction overheating.

Testing

Testing should be done carefully following the procedure below:

Step 1--Double check all soldered connections. Make sure all leads are either insulated, or not touching each other or any exposed metal parts.

Step 2--Borrow or beg for a variable voltage power supply with current limit set at 1A. Set the output at 7V and switch it off. Connect your Ultimate-Protection module, +5V wire to the positive output of the power supply, the ground wire to the negative output of the power supply. Switch the power supply on and see if the output voltage is about 2 volts or less. If not, your module has failed the test.

Short the Gate to the Anode with a short wire or a screwdriver. If it worked, the zener may be at fault. If it did not trigger the SCR, the SCR is bad. Check all components. If you were using surplus item, all components should be checked before use. SCR can be checked with an analog multi-meter. Set it to RX1 range, put the Black prod to the Anode, Red prod to the Cathode. With your third hand short the Gate to the Anode with a short wire. If the meter shows the SCR is conducting current, the SCR passed this rough test. If the current flows without touching the Gate, it may be shorted.

Step 3--Now set the variable power supply to +5V and switch off the power supply. Wait at least 15 seconds, then switch on the power. The output should read 5V, otherwise check the SCR and the zener for short.

If +5V test is passed, gradually raise the voltage. The module should trigger within the range of 6.0V to 7.0V. If the voltage abruptly falls to about 1.5V, your module is ready to be installed. Fasten the module with the two screws to the chassis, next to the power supply. Connect the +5V wire to the Yellow wire and the Ground wire to the black wire, securely as possible. Use twist cones for connections. Do not use module without testing first.

For some people who cannot get the parts or do not possess a soldering iron, make arrangements to have this "Ultimate Protection" module made. If you are interested to know the availability of this module, please send SASE to Richard Fujita, c/o *Computer Shopper* along with a note stating what you require.

SLASH80 Program

This program which enables the users of Sanyo MBC-550/555-2 to use one to four 80 track 96 tpi disk drives in any combinations with ordinary 5.25" DSDD drives is being made available as user-supported software from R.F. & Associates. Arrangements are being made with user groups and clubs. Anybody interested in additional information, send SASE to Richard Fujita requesting the MOD80 brochure. One more note on the SLASH80 is to warn you that this program will not run on

continued on page 142

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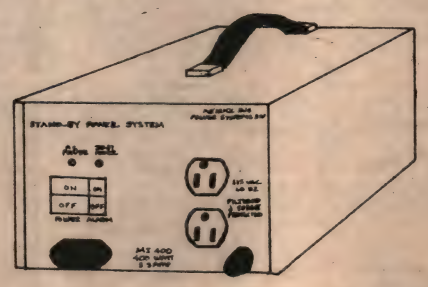
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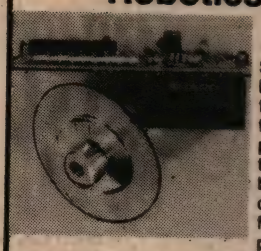
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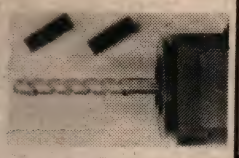
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Sin/Cos analog type from **Sharp**. These units beat the sox, jocks, and 3 pc. suit off the unit being flogged by HP for $10. We have 25K new in boxes for labs and manufacturers building trackballs, plotters and all the rest. In case you don't know the field, an "analog" encoder allows interpolation between encoder wheel slots, in this case, to 3% of step, yielding a theoretical 1/6000 resolution from, in this case, a 192S/R encoder. (In worst possible practice, one may obtain 4 × 192 = 768 zero crossings per rev, and still resolve instantaneous velocity with an analog unit) The pleasant little unit from HP provides nothing but dead air between discreet digital pulses. **Each . . . $10.00**

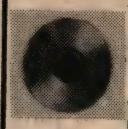
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Driver I.C.s: 3717 for P.W.M. Micro-stepping and efficient use of any supply voltage. **Motor and Two I.C.s only $14.95**

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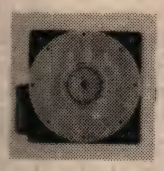


For Plotters, Printers, Robots, and so forth . . . NMB P/N AS-1115. Ball Bearing Hub — Inner Race ID = .155". Pulley OD = 1.00". Thickness = 0.125 (allows 0.015" running clearance when bolted to a flat surface). Groove width approximately 0.030".

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$5.95/ea. or 100/$4.95 ea., 1000/$3.95 ea.

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This princely little motor cost $26. including the beautifully polish helical actuator shaft, which is easily removed. Has dual, spring-loaded ball-bearings. (Complements NMB). This particular motor is the higher-torque, upgraded version for the 810/860 8"head actuator. 9,600 available $7.95

Fiber Optic Assembly



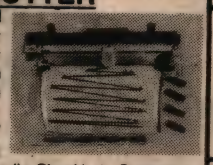
for remote, high intensity illuminations or for sensing in Photometry applications. Completely NEW stock — Often used for spot readings off photographic viewing screens. CRT brightness and color studies and EHV isolation (use a fast rise time detector at one end and an LED emitter at the other.

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★ "X" & "Y" Stepper motors are 4-phase center tapped designed and incorporate anti-lash nylon gear train ★ Pen lift solenoid magnetically latches "up" or "down" ★ 4 Pen cassette for black, red, green and blue pens on paper ★ 4½" paper fed by "mini-pin-feed" platen with hardened steel talons for perfect paper registration ★ Pen change actuated by executing "left mechanical limit" 3 times in immediate succession ★ One set of pens included (Paper & pens also available from Radio Shack) ★ Controller electronics not included ★ Makes absolutely fantastic low-cost, hi-performance chart recorders ★ Input wires: Ground (2), Pen Up/Down (2), Stepper windings (6) ★ Output wires: Pen change reed relay sensor (2) ★ Miniature HP-7580 design (Wow! We love it! For you old-timers, it's impressive like the first Pentax cameras—smart design and really works well!) **X-Y PRINTER PLOTTER MECHANISM** includes Pens and 2 rolls $19.95

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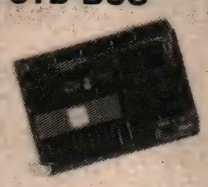
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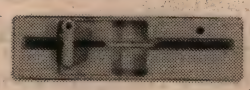
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09	.17	8.70	240	.72	26.40
10	.17	8.70	244	.72	26.40
32	.17	8.70	245	.92	33.66
74	.23	11.70	273	.63	23.10
86	.28	13.80	373	.72	26.40
112	.46	22.80	374	.72	26.40
13S	.46	22.80	646	1.69	42.30

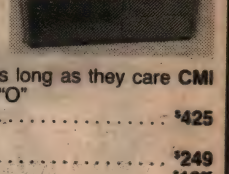
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(PC Compatible Keyboard must be purchased separately). PC "Standard" keyboard: Special with above $59

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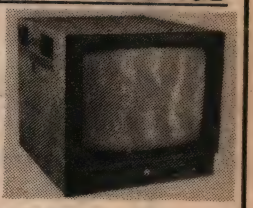
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Etched, Anti-glare surface, high contrast face platge, implosion shield. This CRT is Excess stock from a large **Professional** computer company, and did **NOT** go into a consumer product—and therefore has the features you want and expect from a high quality display. May require spacers and slight mounting improvisation, but it is very much worth the effort. Or if you don't care about all the Hi-tech baloney—it is a Low price/Hi quality spare against the day you need it and don't want to be subjected to the usual Apple treatment!

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19"high line-rate color display monitor in enclosure with:

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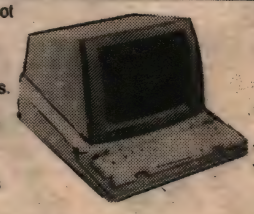
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UNUSED—in manufacturer's boxes! $59.95

Double Your Memory continued from page 43

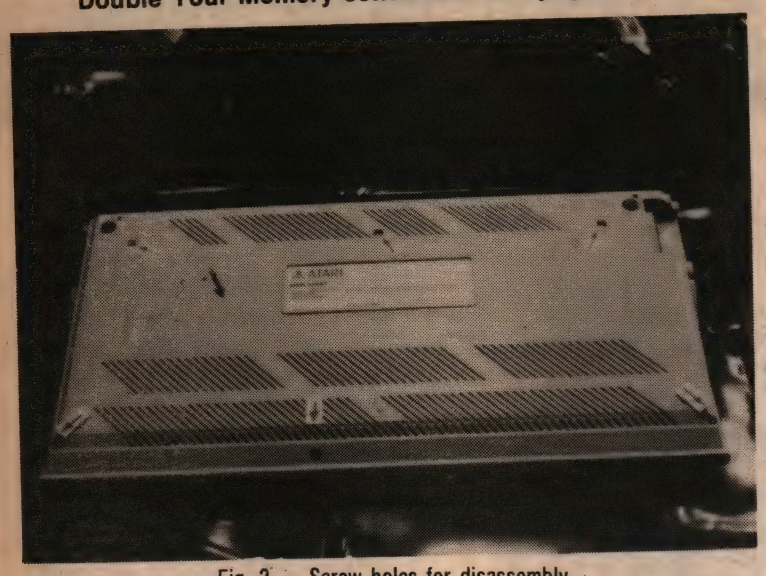


Fig. 2 — Screw holes for disassembly

provide a sheet with more information on static electricity and RAM chips than you would believe.

Step #2

Turn your ST over and remove the six Phillips head screws (See Figure 2). Notice the longer screws all came out of the rear holes. If during reassembly you use the long screws in the front they will extend through the top of the case. Remove the top of the cover, and lay the keyboard to one side (See Figure 3). Note the orientation of the keyboard connector while you unplug the keyboard; one pin on the connector has been keyed. Now, unscrew the circuit board from the bottom of the cover and remove it from the plastic case. Lift the front edge of the board/shield assembly, and wiggle it back and forth as you pull it towards the front. Don't force it; they tend to bind in the back where the connectors poke through the case. Wiggle gently.

Now, remove the RF shielding from the board. The two sections are held together by tabs (See Figure 4) that extend from the bottom section through the PC board and are bent over to hold the top in place. On some early machines, some of the tabs of the RF shield will be soldered. These must be unsoldered.

Step #3

Start taking precautions. With the PC board removed from the RF shield, it's easy to locate the RAM chips and the MMU. The RAM chips run in a straight row along the right front of the board. The MMU is directly above the leftmost RAM chip (See Figure 5).

Lay down your anti-static mat. If you don't have one, a couple of sheets of aluminum foil work just as well. Note the alignment of the MMU chip. There is a small depression in the surface that indicates pin 1. The pin 1 side goes towards the bottom of the board. Make sure you remember how the chip goes in the socket; if you put it back wrong, it will burn up.

Gently remove the MMU chip from its socket by prying under the corners of the chip with the end of the tweezers. Set the MMU down on a square of aluminum foil, wrap it up in the foil, and set it aside in a safe place.

Warning

Do not apply power to the machine from this point on. If you apply power before the complete modification is installed, you will damage the machine.

To the left of each RAM chip is a capacitor that must be removed (See Figure 6)to give you working room. Desolder and remove them. Take your time, and don't force them out. The traces on the PC board are very, very thin and easy to destroy. Too much heat will lift them right off the board. If you pull on the capacitors to get them out, be very gentle; the traces pull off with the slightest pressure.

Once all the capacitors are out, go back and clean up the

continued on page 144

Silver Box continued from page 140

MSDOS 1.25 or on any other version of MSDOS other than 2.11, or on any computer other than the Sanyo MBC-550/555 -2. A general MSDOS program SH80 is being tested for release in mid 1986.

(Author's Note: I could not finish the MIDI experiments in time for printing, but the project is in progress. Do you have any suggestions on this project?)

Q And A

I received a few questions asking what makes the Sanyo MBC-550/555 different from the IBM PC and Clones.

The biggest difference is in the video display system Sanyo uses and the Disk Controller chip Sanyo has employed. The Sanyo video display consists of three video memories for Red, Blue and Yellow, each 16K long. Each bit in the memory represents a tiny dot on the screen arranged as pixels of 640 X 200. The Sanyo screen has the same resolution as in the IBM monochrome mode but in **color**! Each dot from three 16K memories are super-imposed on the screen to produce different colors.

The output of each memory is independent and separately output as Red, Green and Blue (RGB). Actually the screen phosphor colors are Magenta, Yellow and Cyan, not RGB, in RGB monitors. One character is eight dots wide and eight dots high. One horizontal character line is divided into two lines. In other words, each line is composed of one byte wide (eight dots) and four bytes high. In order to compose one character, you need two lines comprised of four raster lines each.

You can experiment this by using Debug. After starting the Debug, type E3C00:0600 or EF000:0600 or EF000:4600, using MSDOS 1.25 or 2.11 but not the so called Color Dos, fill each position by typing characters representing the HEX values. This will place the dots directly on the screen bypassing the BIOS. Experiment with FF (eight dots), AA (four dots in positions: D7, D5, D3 and D1) or 55 (four dots in positions: D6, D4, D3, D0). (More on the Sanyo difference will follow.)

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LOGICAL DEVICES, INC.

That Dangerous Thing continued from page 43

TT. Not to worry where it came from, we'll soon generate it!)

5. Enter engrec.dat

6. Enter 3, to read OUt of the engrec.dat file
(if you were developing or tailoring a file, or adding to one, then you would enter 2, to read INto the file being used. For CORrecting an existing file you would type in 1.

7. Enter 1
(New entries are keyed as 1. As you study the material, and successfully relate the English word with the displayed meaning, the key is increased incrementally and automatically. A review program in which you review 1-key entries daily, 2-key words weekly, 3-key words monthly, 4-key words quarterly, 5-key words semi-annually, and 6-key words annually has advantages. You don't waste time learning what you already know. Yet you review often enough to retain a high percentage of the given vocabulary. Here we are using English vocabulary but any material to be learned can be used. That is, TT allows you to tailor your own education package.)

8 Respond to the displayed meaning with the appropriate word

9 repeat until no words remain, or

9.1 enter LAST to end the session

Developing A Learning Package

1 Enter the system
2 Load ST-BASIC
3 Enter load "tutor.bas"
4 Enter Run
5 Enter a file name. (For example, engrec.dat)
6 Enter 2 (for entering new data INto engrec.dat)
7 Enter 1, required response, cue to be displayed by the computer
(for example, sticking with our engrec.dat file, you might enter

1,cugnet,swan

8 Repeat for each additional learning element
9 Enter last,a,a to quit this session (Note that you can return to your data file, here engrec.dat, in subsequent sessions and add more entries)

Adding Entries To An Existing Learning Package

1 Bring up the system
2 Load ST-BASIC
3 Enter load filename (for example, load engrec.dat)
4 Enter 2
5 Enter 1,required response, cue to be displayed by the computer
(for example, staying with our engrec.dat file, you might add

1,cozy,comfortable

6 Repeat for each needed entry
7 Enter last,a,a to quit this session

Correcting Entries

1 Bring up the system
2 Load ST-BASIC
3 Enter load filename (for example, load engrec.dat)
4 Enter 1
5 Enter required response (such as cozy) to access record to be corrected
6 Enter 3 to change required response field
7 Enter new entry, for example, relaxed
8 Enter 4 to change cue field
9 Enter new cue entry
10 Enter 1 to repeat the process - records are sequential
11 Enter 2 to finish or end the process

General

The above entries, as well as one for displaying all learning records, are prompted by the program itself. For example, to see all learning records, when quieried print SHOWME. Otherwise merely strike return.

This is the essence of the functions performed by TYMON'S TUTOR. The provided record size is 68 characters. The actual entries are limited to 15 characters for the required response, and 45 characters for the displayed

continued on page 194

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Double Your Memory continued from page 142

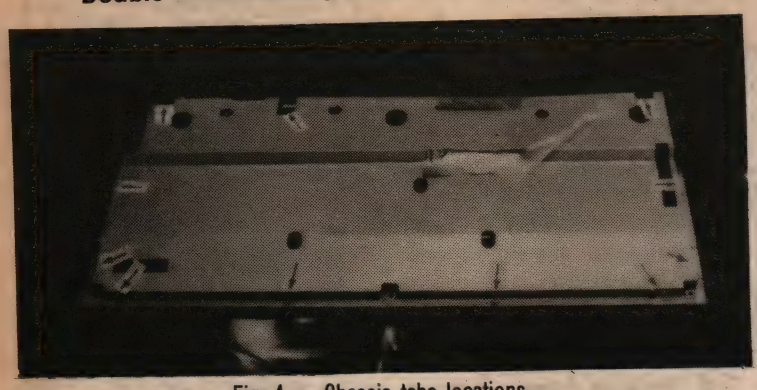


Fig. 4 — Chassis tabs locations

holes. They will be difficult to get to when the second bank of RAM is in place, so clean them now.

Step #4

Prepare your new RAM chips. First, the chip legs are slightly bowed (splayed). You must remove the splay from the legs by bending all the legs in slightly. The easiest way to do this is to hold the chip with needle-nose pliers against the table so that all the legs on one side are lying flat on the table, then rotate the pliers slightly. Turn the chip over, and bend the legs on the other side in. The legs should be perpendicular to the IC body now. (See Figure 7)

Next bend up the RAS and CAS pins (Pins 4 and 15). Bend the entire pin so that it comes straight out of the IC. Next, bend the thin portion of the leg so that it points straight up (See Figure 8).

Slide the new chip over the top of the existing one. Make sure that all pins fit tightly and that the notch is on the same side on both chips. Examine the alignment of the pins on the top and bottom chips. It is very easy to create a solder bridge between pins, so it is important that the pins on the top and bottom chip align (See Figure 9). When you are satisfied that the chip is positioned correctly, solder the legs of the new chip to the corresponding leg on the existing one. Work one side of the chip at a time and be extremely careful to get a good connection. It is easy to flow solder on the top pin without actually soldering the connection when you are working in such a tight place. Be on the lookout for solder bridges; they are very easy to create.

Step #5

Reinstall the capacitors that were removed in step 3. Be sure to bend the legs of the capacitors before soldering so that they don't brush up against the RF shield when it is installed. This is your last

continued on page 151

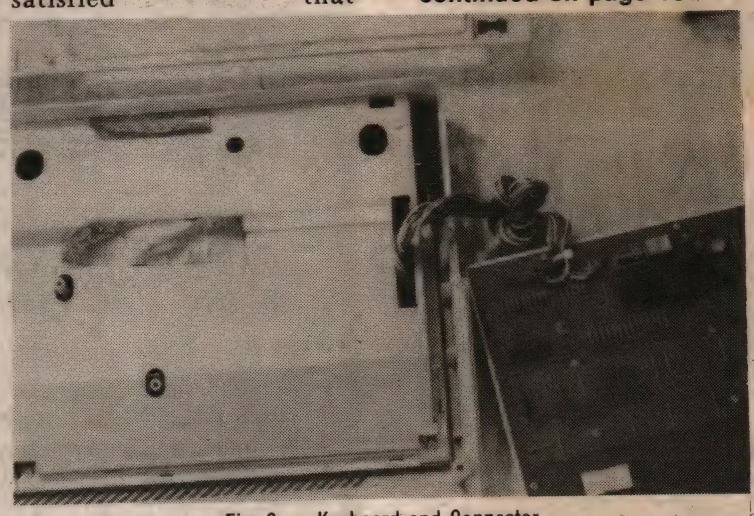


Fig. 3 — Keyboard and Connector

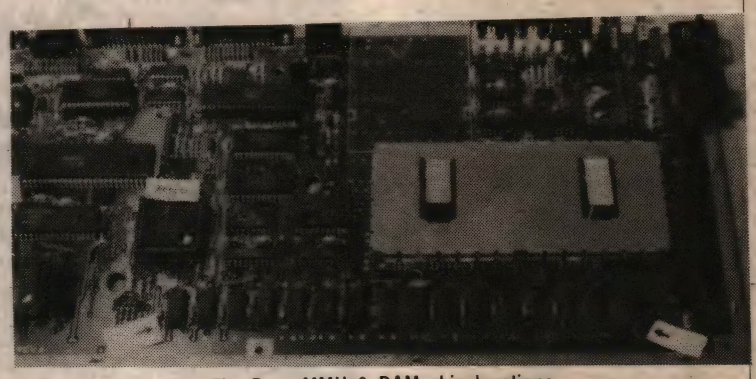


Fig. 5 — MMU & RAM chip locations

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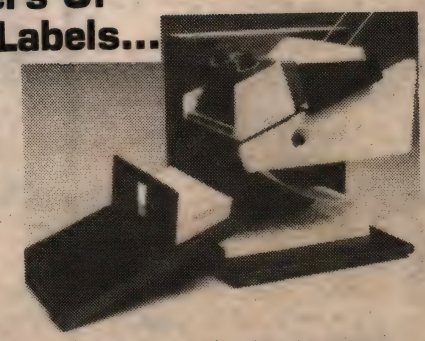
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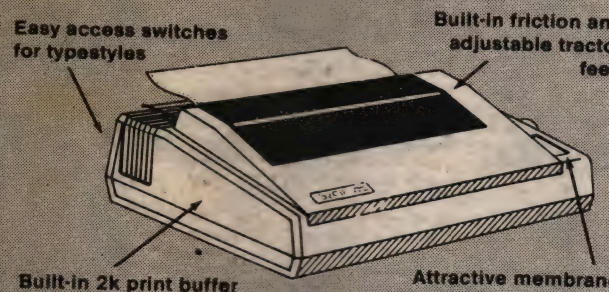
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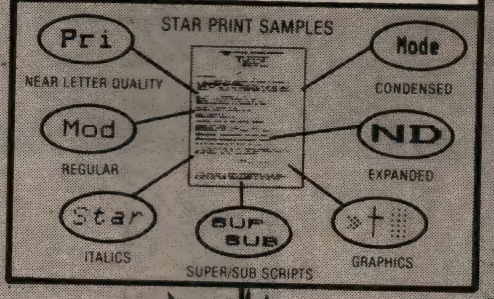
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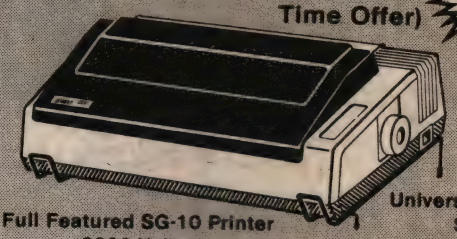


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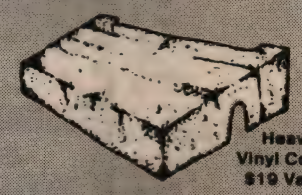
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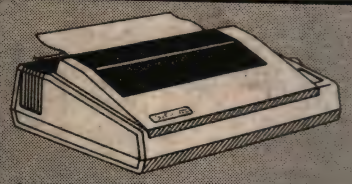
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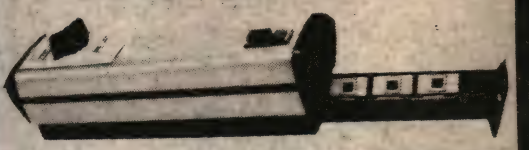
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6847	11.95
6850	1.95
6883	22.95

2.0 MHz

68B00	4.95
68B02	5.95
68B09E	6.95
68B09	6.45
68B21	3.50
68B45	6.75
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68B54	7.95

CLOCK CIRCUITS

MM5369	1.95
MM5369-EST	1.95
MM58167	12.95
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MSM5832	2.95

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68B45	8.95
6847	11.95
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8275	26.95
7220	19.95
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CRT5037	9.95
TMS9918A	19.95

DISK CONTROLLERS

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1791	9.95
1793	9.95
1795	12.95
1797	12.95
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2797	29.95
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AY3-1015	4.95
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2651	4.95
IM6402	6.95
IM6403	9.95
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SSI-263	39.95
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AY3-8912	12.95
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1.0 MHz	2.95
1.8432	2.95
2.0	1.95
2.097152	1.95
2.4576	1.95
3.2768	1.95
3.579545	1.95
4.0	1.95
4.032	1.95
5.0	1.95
5.0688	1.95
6.0	1.95
6.144	1.95
6.5536	1.95
8.0	1.95
10.0	1.95
10.738635	1.95
12.0	1.95
14.31818	1.95
15.0	1.95
16.0	1.95
17.430	1.95
18.0	1.95
18.432	1.95
20.0	1.95
22.1184	1.95
24.0	1.95
32.0	1.95

CRYSTAL OSCILLATORS

1.0MHz	5.95
1.8432	5.95
2.0	5.95
2.4576	5.95
2.5	4.95
4.0	4.95
5.0688	4.95
6.0	4.95
6.144	4.95
8.0	4.95
10.0	4.95
12.0	4.95
12.480	4.95
15.0	4.95
16.0	4.95
18.432	4.95
20.0	4.95
24.0	4.95

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TMS99532	19.95
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2513-001 UP	6.95
AY5-2376	11.95
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74LS00

74LS00	.16	74LS165	.65
74LS01	.18	74LS166	.95
74LS02	.17	74LS169	.95
74LS03	.18	74LS173	.49
74LS04	.16	74LS174	.39
74LS05	.18	74LS175	.39
74LS08	.18	74LS191	.49
74LS09	.18	74LS192	.69
74LS10	.16	74LS193	.69
74LS11	.22	74LS194	.69
74LS12	.22	74LS195	.69
74LS13	.26	74LS196	.59
74LS14	.39	74LS197	.59
74LS15	.26	74LS221	.59
74LS20	.17	74LS240	.69
74LS21	.22	74LS241	.69
74LS22	.22	74LS242	.69
74LS27	.23	74LS243	.69
74LS28	.26	74LS244	.69
74LS30	.17	74LS245	.79
74LS32	.18	74LS251	.49
74LS33	.28	74LS253	.49
74LS37	.26	74LS256	1.79
74LS38	.26	74LS257	.39
74LS42	.39	74LS258	.49
74LS47	.59	74LS259	1.29
74LS48	.69	74LS260	.49
74LS51	.17	74LS266	.39
74LS73	.29	74LS273	.79
74LS74	.24	74LS279	.39
74LS75	.29	74LS280	1.98
74LS76	.29	74LS283	.59
74LS83	.49	74LS290	.89
74LS85	.49	74LS293	.89
74LS86	.22	74LS299	1.49
74LS90	.39	74LS322	3.95
74LS92	.49	74LS323	2.49
74LS93	.39	74LS364	1.95
74LS95	.49	74LS365	.39
74LS107	.34	74LS367	.39
74LS109	.36	74LS368	.39
74LS112	.29	74LS373	.79
74LS122	.45	74LS374	.79
74LS123	.49	74LS375	.95
74LS124	2.75	74LS377	.79
74LS125	.39	74LS378	1.18
74LS126	.39	74LS390	1.19
74LS132	.39	74LS393	.79
74LS133	.49	74LS541	1.49
74LS136	.39	74LS624	1.95
74LS138	.39	74LS640	.99
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74LS145	.99	74LS669	1.29
74LS147	.99	74LS670	.89
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74LS153	.39	74LS684	3.20
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74LS155	.59	74LS783	22.95
74LS156	.49	81LS95	1.49
74LS157	.35	81LS96	1.49
74LS158	.29	81LS97	1.49
74LS160	.29	81LS98	1.49
74LS161	.39	25LS2521	2.80
74LS162	.49	25LS2569	2.80
74LS163	.39	26LS31	1.95
74LS164	.49	26LS32	1.95

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74HC00

74HC: Operate at CMOS logic levels and are ideal for new, all-CMOS designs.

74HC00	.59	74HC148	1.19
74HC02	.59	74HC151	.89
74HC04	.59	74HC154	2.49
74HC08	.59	74HC157	.89
74HC10	.59	74HC158	.95
74HC14	.79	74HC163	1.15
74HC20	.59	74HC175	.99
74HC27	.59	74HC240	1.89
74HC30	.59	74HC244	1.89
74HC32	.69	74HC245	1.89
74HC51	.59	74HC257	.85
74HC74	.75	74HC259	1.39
74HC85	1.35	74HC273	1.89
74HC86	.69	74HC299	4.99
74HC93	1.19	74HC368	.99
74HC107	.79	74HC373	2.29
74HC109	.79	74HC374	2.29
74HC112	.79	74HC390	1.39
74HC125	1.19	74HC393	1.39
74HC132	1.19	74HC4017	1.99
74HC133	.69	74HC4020	1.39
74HC138	.99	74HC4049	.89
74HC139	.99	74HC4050	.89

74HCT00

74HCT: Direct, drop-in replacements for LS TTL and can be intermixed with 74LS in the same circuit.

74HCT00	.69	74HCT166	3.05
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74HCT04	.69	74HCT193	1.39
74HCT08	.69	74HCT194	1.19
74HCT10	.69	74HCT240	2.19
74HCT11	.69	74HCT241	2.19
74HCT27	.69	74HCT244	2.19
74HCT30	.69	74HCT245	2.19
74HCT32	.79	74HCT257	.99
74HCT74	.85	74HCT259	1.59
74HCT75	.95	74HCT273	2.09
74HCT138	1.15	74HCT367	1.09
74HCT139	1.15	74HCT373	2.49
74HCT154	2.99	74HCT374	2.49
74HCT157	.99	74HCT393	1.59
74HCT158	.99	74HCT4017	2.19
74HCT161	1.29	74HCT4040	1.59
74HCT164	1.39	74HCT4060	1.49

74F00

74F00	.69	74F74	.79	74F251	1.69
74F02	.69	74F86	.99	74F253	1.69
74F04	.79	74F138	1.69	74F257	1.69
74F08	.69	74F139	1.69	74F280	1.79
74F10	.69	74F157	1.69	74F283	3.95
74F32	.69	74F240	3.29	74F373	4.29
74F64	.89	74F244	3.29	74F374	4.29

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4020	.59	4527	1.95
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4044	.69	74C74	.59
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4050	.29	74C151	2.25
4051	.69	74C161	.99
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4056	2.19	74C192	1.49
4060	.69	74C193	1.49
4066	.29	74C221	1.75
4069	.19	74C240	1.89
4076	.59	74C244	1.89
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4086	.89	74C917	8.95
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14411	9.95	74C926	7.95
14412	6.95	80C97	.95

7400/9000

7400	.19	74147	2.49
7402	.19	74148	1.20
7404	.19	74150	1.35
7406	.29	74151	.55
7407	.29	74153	.55
7408	.24	74154	1.49
7410	.19	74155	.75
7411	.25	74157	.55
7414	.49	74159	1.65
7416	.25	74161	.69
7417	.25	74163	.69
7420	.19	74164	.85
7423	.29	74165	.85
7430	.19	74166	1.00
7432	.29	74175	.89
7438	.29	74177	.75
7442	.49	74178	1.15
7445	.69	74181	2.25
7447	.89	74182	.75
7470	.35	74184	2.00
7473	.34	74191	1.15
7474	.33	74192	.79
7475	.45	74194	.85
7476	.35	74196	.79
7483	.50	74197	.75
7485	.59	74199	1.35
7486	.35	74221	1.35
7489	2.15	74246	1.35
7490	.39	74247	1.25
7492	.50	74248	1.85
7493	.35	74249	1.95
7495	.55	74251	.75
7497	2.75	74265	1.35
74100	2.29	74273	1.95
74121	.29	74278	3.11
74123	.49	74367	.65
74125	.45	74368	.65
74141	.65	9368	3.95
74143	5.95	9602	1.50
74144	2.95	9637	2.95
74145	.60	96S02	1.95

74S00

74S00	.29	74S163	1.29
74S02	.29	74S168	3.95
74S03	.29	74S174	.79
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74S140	.55	74S288	1.69
74S151	.79	74S299	2.95
74S153	.79	74S373	1.69
74S157	.79	74S374	1.69
74S158	.95	74S471	4.95
74S161	1.29	74S571	2.95

VOLTAGE REGULATORS

TO-220 CASE

7805T	.49	7905T	.59
7808T	.49	7908T	.59
7812T	.49	7912T	.59
7815T	.49	7915T	.59

TO-3 CASE

7805K	1.39	7905K	1.49
7812K	1.39	7912K	1.49

TO-92 CASE

78L05	.49	79L05	.69
78L12	.49	79L12	.69

OTHER VOLTAGE REGS

LM323K	5V 3A	TO-3	4.79
LM338K	Adj 5A	TO-3	3.95
78H05K	5V 5A	TO-3	7.95
78H12K	12V5A	TO-3	8.95
78P05K	5V 10A	TO-3	14.95

IC SOCKETS

	1-99	100
8 PIN ST	.13	.11
14 PIN ST	.15	.12
16 PIN ST	.17	.13
18 PIN ST	.20	.18
20 PIN ST	.29	.27
22 PIN ST	.30	.27
24 PIN ST	.30	.27
28 PIN ST	.40	.32
40 PIN ST	.49	.39
64 PIN ST	4.25	CALL
ST=SOLDERTAIL		
8 PIN WW	.59	.49
14 PIN WW	.69	.52
16 PIN WW	.69	.58
18 PIN WW	.99	.90
20 PIN WW	1.09	.98
22 PIN WW	1.39	1.28
24 PIN WW	1.49	1.35
28 PIN WW	1.69	1.49
40 PIN WW	1.99	1.80
WW=WIREWRAP		
16 PIN ZIF	4.95	CALL
24 PIN ZIF	5.95	CALL
28 PIN ZIF	6.95	CALL
40 PIN ZIF	9.95	CALL
ZIF=TEXTOOL (ZERO INSERTION FORCE)		

LINEAR

TL066	.99	LM733	.98
TL071	.69	LM741	.29
TL072	1.09	LM747	.69
TL074	1.95	LM748	.59
TL081	.59	MC1330	1.69
TL082	.99	MC1350	1.19
TL084	1.49	MC1372	6.95
LM301	.34	LM1414	1.59
LM309K	1.25	LM1458	.49
LM311	.59	LM1488	.49
LM311H	.89	LM1489	.49
LM317K	3.49	LM1496	.85
LM317T	.95	LM1812	8.25
LM318	1.49	LM1889	1.95
LM319	1.25	ULN2003	.79
LM320	see7900	XR2206	3.75
LM322	1.65	XR2211	2.95
LM323K	4.79	XR2240	1.95
LM324	.49	MPQ2907	1.95
LM331	3.95	LM2917	1.95
LM334	1.19	CA3046	.89
LM335	1.40	CA3081	.99
LM336	1.75	CA3082	.99
LM337K	3.95	CA3086	.80
LM338K	3.95	CA3089	1.95
LM339	.59	CA3130E	.99
LM340	see7800	CA3146	1.29
LM350T	4.60	CA3160	1.19
LF353	.59	MC3470	1.95
LF356	.99	MC3480	8.95
LF357	.99	MC3487	2.95
LM358	.59	LM3900	.49
LM380	.89	LM3909	.98
LM383	1.95	LM3911	2.25
LM386	.89	LM3914	2.39
LM393	.45	MC4024	3.49
LM394H	4.60	MC4044	3.99
TL494	4.20	RC4136	1.25
TL497	3.25	RC4558	.69
NE555	.29	LM13600	1.49
NE556	.49	75107	1.49
NE558	1.29	75110	1.95
NE564	1.95	75150	1.95
LM565	.95	75154	1.95
LM566	1.49	75188	1.25
LM567	.79	75189	1.25
NE570	2.95	75451	.39
NE590	2.50	75452	.39
NE592	.98	75453	.39
LM710	.75	75477	1.29
LM723	.49	75492	.79

H=TO-5 CAN, K=TO-3, T=TO-220

DATA ACQ INTERFACE

ADC0800	15.55	8T26	1.29
ADC0804	3.49	8T28	1.29
ADC0809	4.49	8T95	.89
ADC0816	14.95	8T96	.89
ADC0817	9.95	8T97	.59
ADC0831	8.95	8T98	.89
DAC0800	4.49	DM8131	2.95
DAC0806	1.95	DP8304	2.29
DAC0808	2.95	DS8833	2.25
DAC1020	8.25	DS8835	1.99
DAC1022	5.95	DS8836	.99
MC1408L8	2.95	DS8837	1.65

EDGECARD CONNECTORS

100 PIN ST	S-100	.125	3.95
100 PIN WW	S-100	.125	4.95
62 PIN ST	IBM PC	.100	1.95
50 PIN ST	APPLE	.100	2.95
44 PIN ST	STD	.156	1.95
44 PIN WW	STD	.156	4.95

36 PIN CENTRONICS

MALE

IDCEN36	RIBBON CABLE	6.95
CEN36	SOLDER CUP	4.95
CEN36PC	RT ANGLE PC MOUNT	4.95

FEMALE

IDCEN36/F	RIBBON CABLE	7.95

INTERSIL

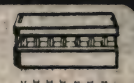
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ICL7107	12.95
ICL7660	2.95
ICL8038	4.95
ICM7207A	5.95
ICM7208	15.95

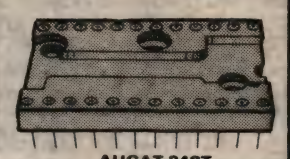
DIP CONNECTORS

DESCRIPTION	ORDER BY	CONTACTS								
		8	14	16	18	20	22	24	28	40
HIGH RELIABILITY TOOLED ST IC SOCKETS	AUGATxxST	.62	.79	.89	1.09	1.29	1.39	1.49	1.69	2.49
HIGH RELIABILITY TOOLED WW IC SOCKETS	AUGATxxWW	1.30	1.80	2.10	2.40	2.50	2.90	3.15	3.70	5.40
COMPONENT CARRIES (DIP HEADERS)	ICCxx	.49	.59	.69	.99	.99	.99	.99	1.09	1.49
RIBBON CABLE DIP PLUGS (IDC)	IDPxx	---	.95	.95	---	---	---	1.75	---	2.95

FOR ORDERING INSTRUCTIONS SEE D-SUBMINIATURE BELOW


ICC16


IDP14


AUGAT 24ST

D-SUBMINIATURE

DESCRIPTION		ORDER BY	CONTACTS					
			9	15	19	25	37	50
SOLDER CUP	MALE	DBxxP	.82	.90	1.25	1.25	1.80	3.48
	FEMALE	DBxxS	.95	1.15	1.50	1.50	2.35	4.32
RIGHT ANGLE PC SOLDER	MALE	DBxxPR	1.20	1.49	---	1.95	2.65	---
	FEMALE	DBxxSR	1.25	1.55	---	2.00	2.79	---
WIRE WRAP	MALE	DBxxPWW	1.69	2.56	---	3.89	5.60	---
	FEMALE	DBxxSWW	2.76	4.27	---	6.84	9.95	---
IDC RIBBON CABLE	MALE	IDBxxP	2.70	2.95	---	3.98	5.70	---
	FEMALE	IDBxxS	2.92	3.20	---	4.33	6.76	---
HOODS	METAL	MHOODxx	1.25	1.25	1.30	1.30	---	---
	GREY	HOODxx	.65	.65	---	.65	.75	.95

ORDERING INSTRUCTIONS: INSERT THE NUMBER OF CONTACTS IN THE POSITION MARKED "xx" OF THE "ORDER BY" PART NUMBER LISTED.

EXAMPLE: A 15 PIN RIGHT ANGLE MALE PC SOLDER WOULD BE DB15PR.

MOUNTING HARDWARE $1.00


MTG HDWR


HOOD25

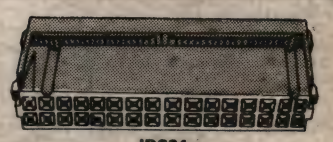

DB37S


IDB37S

IDC CONNECTORS

DESCRIPTION	ORDER BY	CONTACTS					
		10	20	26	34	40	50
SOLDER HEADER	IDHxxS	.82	1.29	1.68	2.20	2.58	3.24
RIGHT ANGLE SOLDER HEADER	IDHxxSR	.85	1.35	1.76	2.31	2.72	3.39
WW HEADER	IDHxxW	1.86	2.98	3.84	4.50	5.28	6.63
RIGHT ANGLE WW HEADER	IDHxxWR	2.05	3.28	4.22	4.45	4.80	7.30
RIBBON HEADER SOCKET	IDSxx	.79	.99	1.39	1.59	1.99	2.25
RIBBON HEADER	IDMxx	---	5.50	6.25	7.00	7.50	8.50
RIBBON EDGE CARD	IDExx	1.75	2.25	2.65	2.75	3.80	3.95

FOR ORDERING INSTRUCTIONS SEE D-SUBMINIATURE ABOVE


IDS34


IDE50

DIODES/OPTO/TRANSISTORS

1N751	.25	4N26	.69
1N759	.25	4N27	.69
1N4148	25/1.00	4N28	.69
1N4004	10/1.00	4N33	.89
1N5402	.25	4N37	1.19
KBP04	.55	MCT-2	.59
KBU8A	.95	MCT-6	1.29
MDA990-2	.35	TIL-111	.99
N2222	.25	2N3906	.10
PN2222	.10	2N4401	.25
2N2905	.50	2N4402	.25
2N2907	.25	2N4403	.25
2N3055	.79	2N6045	1.75
2N3904	.10	TIP31	.49

LED DISPLAYS

FND-357(359)		COM CATHODE	.362"	1.25
FND-500(503)		COM CATHODE	.5"	1.49
FND-507(510)		COM ANODE	.5"	1.49
MAN-72		COM ANODE	.3"	.99
MAN-74		COM CATHODE	.3"	.99
MAN-8940		COM CATHODE	.8"	1.99
TIL-313		COM CATHODE	.3"	.45
HP5082-7760		COM CATHODE	.43"	1.29
TIL-311	4x7	HEX W/LOGIC	.270"	9.95
HP5082-7340	4x7	HEX W/LOGIC	.290"	7.95

DIFFUSED LEDS

		1-99	100-UP
JUMBO RED	T1¾	.10	.09
JUMBO GREEN	T1¾	.14	.12
JUMBO YELLOW	T1¾	.14	.12
MOUNTING HDW	T1¾	.10	.09
MINI RED	T1	.10	.09

SWITCHES

SPST	MINI-TOGGLE ON-ON	1.25
DPDT	MINI-TOGGLE ON-ON	1.50
DPDT	MINI-TOGGLE ON-OFF-ON	1.75
SPST	MINI-PUSHBUTTON N.O.	.39
SPST	MINI-PUSHBUTTON N.C.	.39
SPST	TOGGLE ON-OFF	.49
BCD OUTPUT 10 POSITION 6 PIN DIP		1.95

DIP SWITCHES

4 POSITION	.85	7 POSITION	.95
5 POSITION	.90	8 POSITION	.95
6 POSITION	.90	10 POSITION	1.29

RIBBON CABLE

CONTACTS	SINGLE COLOR		COLOR CODED	
	1'	10'	1'	10'
10	.18	1.60	.30	2.75
16	.28	2.50	.48	4.40
20	.36	3.20	.60	5.50
25	.45	4.00	.75	6.85
26	.46	4.10	.78	7.15
34	.61	5.40	1.07	9.35
40	.72	6.40	1.20	11.00
50	.89	7.50	1.50	13.25

HARD TO FIND "SNAPABLE" HEADERS

CAN BE SNAPPED APART TO MAKE ANY SIZE HEADER, ALL WITH .1" CENTERS

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1x40	RIGHT ANGLE	1.49
2x40	STRAIGHT LEAD	2.49
2x40	RIGHT ANGLE	2.99

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GOLD CONTACTS SPACED AT .1" CENTERS



5/$1.00

It was a pleasure to place an order with your people. I found the response pleasant and helpful and the answers prompt and correct. The delivery on my most recent order was fast, correct and well packed. I already had faith in the quality since my family has been using some of your products for several years with no problems.

Sincerely, J.D. Hattaway

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PRECUT ASSORTMENT
IN ASSORTED COLORS $27.50
100ea: 5.5", 6.0", 6.5", 7.0"
250ea: 2.5", 4.5", 5.0"
500ea: 3.0", 3.5", 4.0"

SPOOLS
100 feet $4.30 250 feet $7.25
500 feet $13.25 1000 feet $21.95

Please specify color:
Blue, Black, Yellow or Red

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* LOW COST
* FITS LC-HP BELOW
* 6 AMP 120/240 VOLT



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LC-2	2 CONDUCTOR	.39
LC-3	2 CONDUCTOR	.99
LC-HP	3 CONDUCTOR W/STD FEMALE SOCKET	1.49

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3.15" SQ	ROTRON	14.95
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WIRE WRAP PROTOTYPE CARDS
FR-4 EPOXY GLASS LAMINATE
WITH GOLD-PLATED EDGE-CARD FINGERS



IBM-PR2

IBM
BOTH CARDS HAVE SILK SCREENED LEGENDS AND INCLUDES MOUNTING BRACKET

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IBM-PR2	AS ABOVE WITH DECODING LAYOUT	$29.95

S-100

P100-1	BARE - NO FOIL PADS	$15.15
P100-2	HORIZONTAL BUS	$21.80
P100-3	VERTICAL BUS	$21.80
P100-4	SINGLE FOIL PADS PER HOLE	$22.75

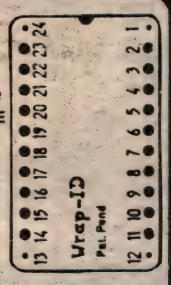
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P500-1	BARE - NO FOIL PADS	$15.15
P500-3	HORIZONTAL BUS	$22.75
P500-4	SINGLE FOIL PADS PER HOLE	$21.80
7060-45	FOR APPLE IIe AUX SLOT	$30.00

SOCKET-WRAP I.D.™
* SLIPS OVER WIRE WRAP PINS
* IDENTIFIES PIN NUMBERS ON WRAP SIDE OF BOARD
* CAN WRITE ON PLASTIC; SUCH AS IC #

PINS	PART#	PCK. OF	PRICE
8	IDWRAP 08	10	1.95
14	IDWRAP 14	10	1.95
16	IDWRAP 16	10	1.95
18	IDWRAP 18	5	1.95
20	IDWRAP 20	5	1.95
22	IDWRAP 22	5	1.95
24	IDWRAP 24	5	1.95
28	IDWRAP 28	5	1.95
40	IDWRAP 40	5	1.95

PLEASE ORDER BY NUMBER OF PACKAGES (PCK. OF)

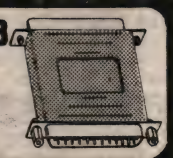


ID WRAP 24

FRAME STYLE TRANSFORMERS

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12.6V AC CT	4 AMP	7.95
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25.2V AC CT	2 AMP	7.95

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* FOR IBM PC-XT COMPATIBLE
* 130 WATTS
* +5V @ 15A, +12V @ 4.2A -5V @ .5A, -12V @ .5A
* ONE YEAR WARRANTY



PS-IBM

PS-130 $99.95
* 130 WATTS
* SWITCH ON REAR
* FOR USE IN OTHER IBM TYPE MACHINES
* 90 DAY WARRANTY



PS-130

PS-A $49.95
* USE TO POWER APPLE TYPE SYSTEMS
* +5V @ 4A, +12V @ 2.5A -5V @ .5A, -12V @ .5A
* APPLE POWER CONNECTOR



PS-A

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* UL APPROVED
* ALUMINUM ENCLOSURE

PS-TDK $29.95
* +5V @ 4A, +12V @ 2A +12V @ 2.8A, -12V @ .30A
* 6.2" x 7.4" x 1.7", 1.6 LBS.

PS-11951 $29.95
* MANUFACTURED BY ASTEC
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* 5.0" x 8.0" x 2.0", 1.6 LBS.



PS-SPL200

CAPACITORS

TANTALUM

1.0µf	15V	.35	.47µf	35V	.45
6.8	15V	.70	1.0	35V	.45
10	15V	.80	2.2	35V	.65
22	15V	1.35	4.7	35V	.85
.22	35V	.40	10	35V	1.00

DISC

10pf	50V	.05	680	50V	.05
22	50V	.05	.001µf	50V	.05
27	50V	.05	.0022	50V	.05
33	50V	.05	.005	50V	.05
47	50V	.05	.01	50V	.07
68	50V	.05	.02	50V	.07
100	50V	.05	.05	50V	.07
220	50V	.05	.1	12V	.10
560	50V	.05	.1	50V	.12

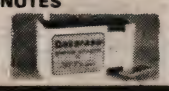
MONOLITHIC

.01µf	50V	.14	.1µf	50V	.18
.047µf	50V	.15	.47µf	50V	.25

ELECTROLYTIC

	RADIAL			AXIAL	
1µf	25V	.14	1µf	50V	.14
2.2	35V	.15	10	50V	.16
4.7	50V	.15	22	16V	.14
10	50V	.15	47	50V	.20
47	35V	.18	100	35V	.25
100	16V	.18	220	25V	.30
220	35V	.20	470	50V	.50
470	25V	.30	1000	16V	.60
2200	16V	.70	2200	16V	.70
4700	25V	1.45	4700	16V	1.25
COMPUTER GRADE			44,000µf	30V	3.95

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* ERASES TWO EPROMS IN 10 MINUTES
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1/4 WATT RESISTORS
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10 PCS	same value	.05	100 PCS	same value	.02
50 PCS	same value	.025	1000 PCS	same value	.015

RESISTOR NETWORKS

SIP	10 PIN	9 RESISTOR	.69
SIP	8 PIN	7 RESISTOR	.59
DIP	16 PIN	8 RESISTOR	1.09
DIP	16 PIN	15 RESISTOR	1.09
DIP	14 PIN	7 RESISTOR	.99
DIP	14 PIN	13 RESISTOR	.99

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.01 µf MONOLITHIC	100/$10.00
.1 µf CERAMIC DISC	100/$6.50
.1 µf MONOLITHIC	100/$12.50

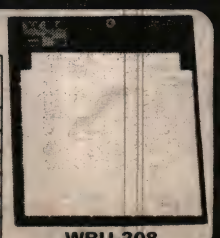
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WBU-204-3	3.94 x 8.45"	1	100	2	1260	2	17.95
WBU-204	5.13 x 8.45"	4	400	2	1260	3	24.95
WBU-206	6.88 x 9.06"	5	500	3	1890	4	29.95
WBU-208	8.25 x 9.45"	7	700	4	2520	4	39.95



WBU-208

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FOR APPLE COMPUTERS

AP-150 $99.95



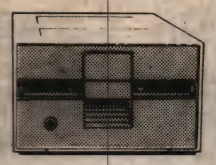
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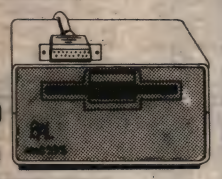
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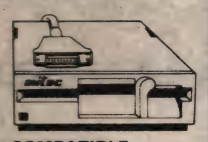
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- USER DEFINED FUNCTION KEYS
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- REPLACEMENT FOR APPLE II KEYBOARD
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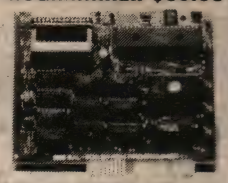
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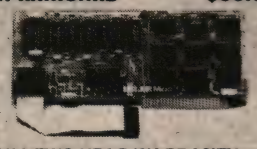
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- DUPLICATE OR BURN ANY STANDARD 27xx SERIES EPROM
- EASY TO USE MENU-DRIVEN SOFTWARE IS INCLUDED
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- HIGH SPEED WRITE ALGORITHM
- LED INDICATORS FOR ACTIVITY
- NO EXTERNAL POWER SUPPLY NEEDED
- ONE YEAR WARRANTY

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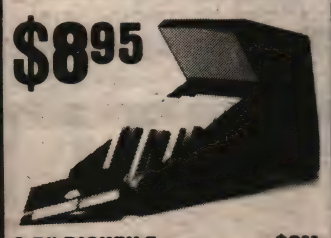
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HOLDS 70 5¼" DISKETTES

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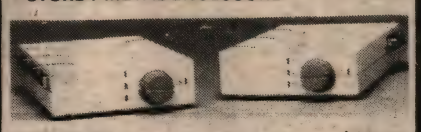
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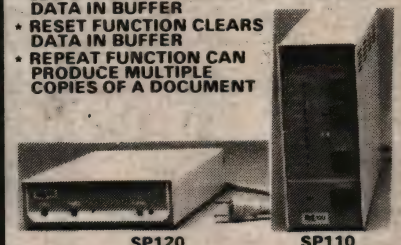
- 64K UPGRADABLE TO 256K
- LED INDICATOR SHOWS VOLUME OF DATA IN BUFFER

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- 6 SELECTBALE BAUD RATES, FROM 600B—19,200B

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- LED BARGRAPH DISPLAYS AMOUNT OF DATA IN BUFFER
- RESET FUNCTION CLEARS DATA IN BUFFER
- REPEAT FUNCTION CAN PRODUCE MULTIPLE COPIES OF A DOCUMENT



SP120 SP110

NASHUA DISKETTES DEALS

5¼" SOFT SECTOR
DS/DD WITH HUB RINGS

$9.90 BOX OF 10 **69¢ea** BULK QTY 50 **59¢ea** BULK QTY 250

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N-MD2D	DS/DD SOFT	$9.90
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N-MD2H	DS/HD FOR AT	$49.95

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N-FD1	SS/DD SOFT	$27.95
N-FD2D	DS/DD SOFT	$34.95

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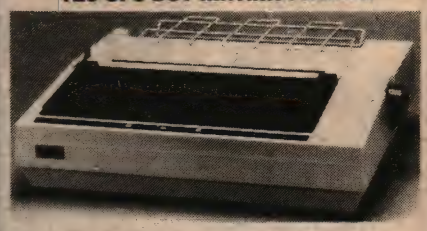
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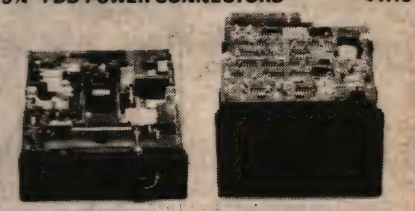
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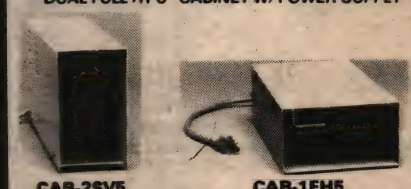
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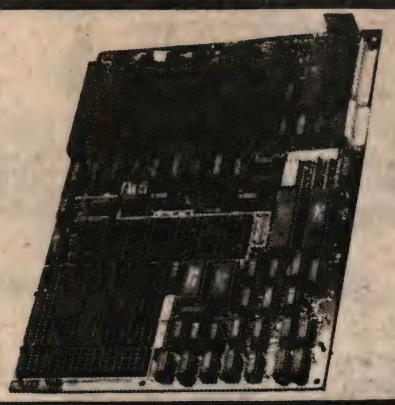
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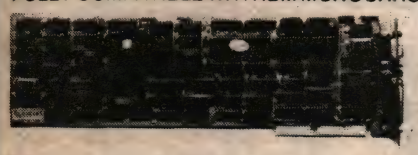
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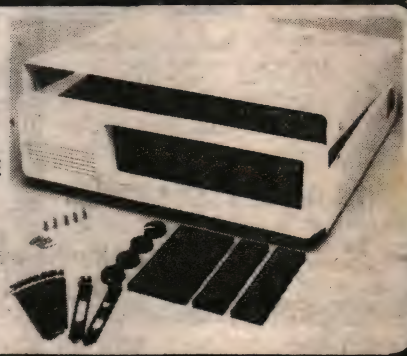
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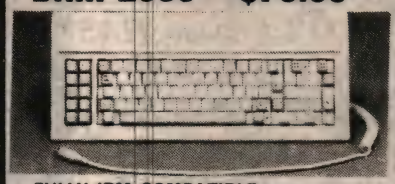
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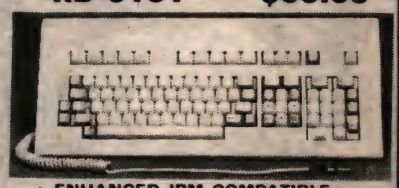
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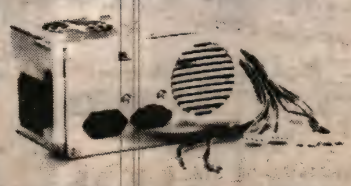
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Double Your Memory continued from page 144

good chance to look for solder bridges and poor solder joints.

Step #6
Warning

Never apply power when any RAM chip has a pin that is not connected. You will destroy the RAM chip.

In this step run the three fly wires to bring the RAS and CAS signals to the new memory bank. The first wire connects pin 4 (RAS) (See Figure 10) of all the new chips to pin 18 of the MMU. To do this, measure out a length of wire along the RAM bank that's about 4 or 5 inches longer than that of the PC board.

Cut three wires this length. If you have three different colors, the job is a little easier; but, it is not vital.

Note!

Be sure to keep your connections as close to the IC as possible, because you will need to trim the bent up pins as low as possible so that they don't touch the RF shield when it is replaced.

Strip the insulation off the first wire so that the bare portion of the wire is two inches longer than the length of RAM array. Position the wire so that the insulated portion of the wire is to the left of the RAM chips and the bare portion lies across the RAM chips. Starting at the leftmost RAM chip, (U16) wrap a loop around pin 4, and solder the wire to the pin. Continue looping and soldering until all the chips are connected (See Figure 10). Clip off and discard the remaining portion of bare wire.

Take the second and third

continued on page 154

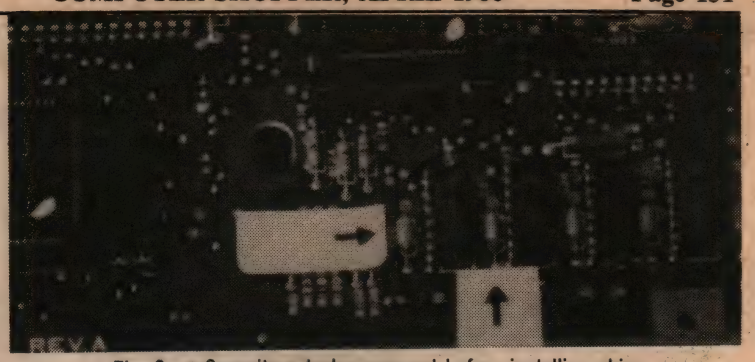


Fig. 6 — Capacitors to be removed before installing chips

Figure 7

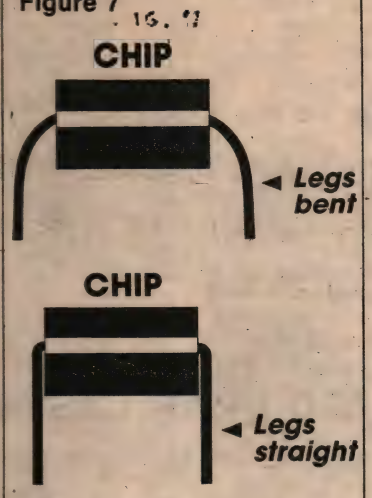
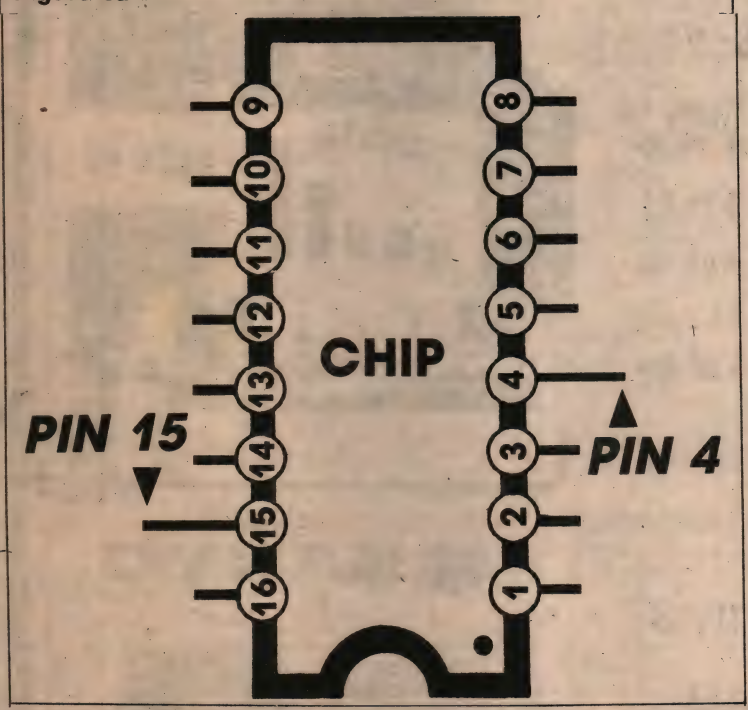


Figure 8a



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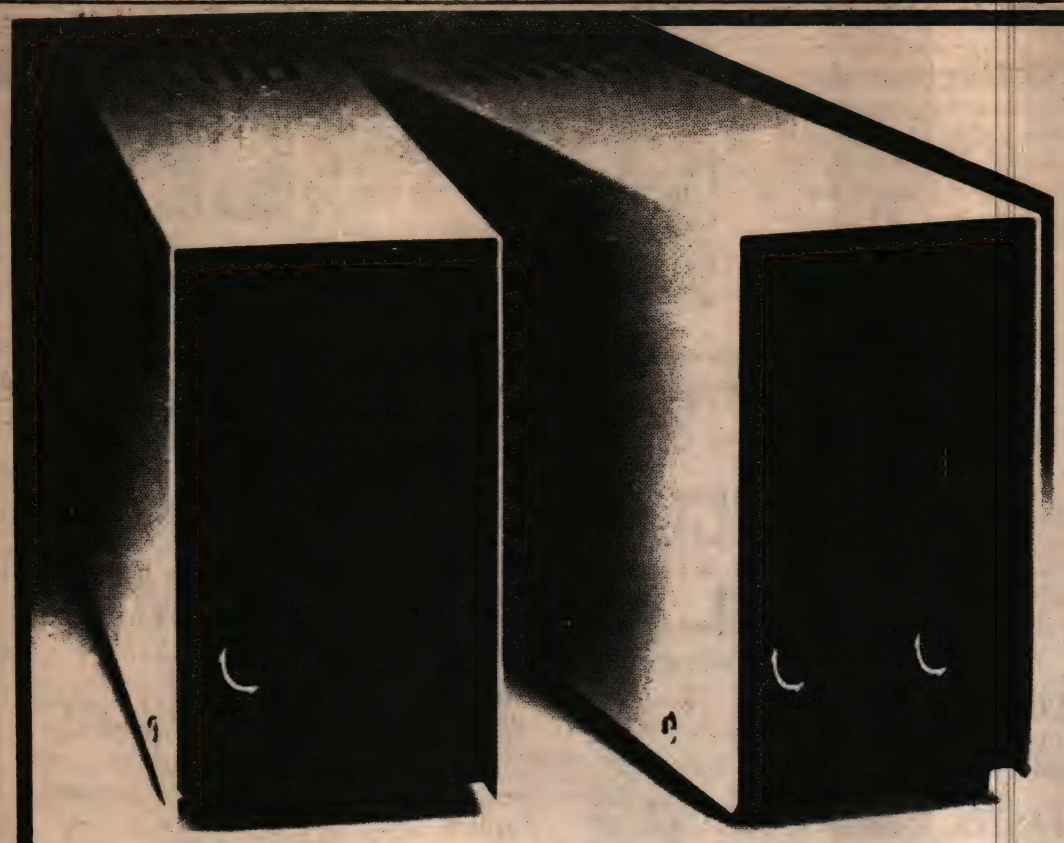
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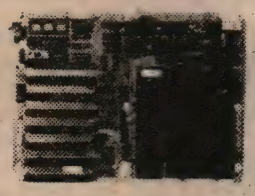
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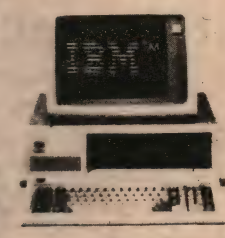
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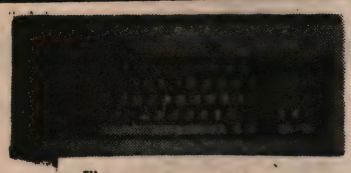
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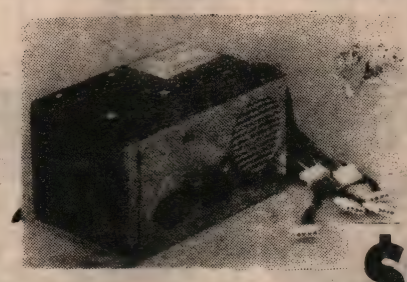
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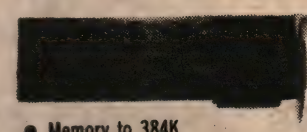
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Double Your Memory continued from page 151

wires and strip enough insulation to connect eight chips. (Remember to strip 2 inches extra.) Start with the second wire, and the leftmost chip, (U16) and loop the wire around pin 15. Solder the wire and continue looping and soldering until you have connected the left eight chips. Clip off the excess wire and discard it.

Using the third wire, start at pin 15 of U32, and wire pin 15 of the last eight chips together.

Note that the MMU chip pin numbering doesn't have pin 1 on a corner as you would expect. The MMU pin numbers are silk-screened on the component side of the board. Pin 1 is in the middle of the lower edge. Turn the board over. (See Figure 11 to help locate the pin locations on the bottom side.) Be very careful. You will also notice that the MMU socket has two rows of pins on the solder side of the board.

Since pin 1 starts at the middle of the row, the last pin of the outer row of lower pins is pin 9. You will notice that just around the corner of the socket is pin 10. As you turn the corner, the even pins become the outer row and the odd pins become the inner row. Refer to Figure 11 to help you identify the correct pins.

Route the three wires through the hole below and to the left of the MMU. One at a time, measure out the wires to the proper pins on the MMU, trim them to length, and solder them starting with wire 1, which goes to pin 18 on the MMU. Be careful when soldering to the MMU socket pins; they can move around a great deal if you push them while the solder is molten.

The second wire goes to pin 21 of the MMU socket. The third wire is connected to pin 22 of the MMU socket. Now that all of the wires have been soldered, replace the MMU chip.

For all practical purposes the job is now done. Take a good look at your work and be as sure as possible that everything is right before you turn the power back on. Keep an eye open for solder bridges. Don't bother to reassemble the whole thing yet. Place the PC board in the bottom half of the case. Plug in the keyboard and hook up the system to your monitor, drive, and power supply.

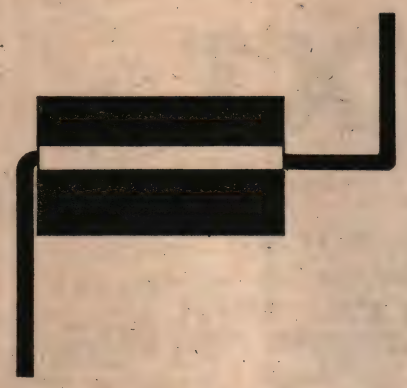
Turn on the power. If it boots, you should be all right. If the system boots, try to copy a complete disk to a second disk by dragging the icons on top of one another. You should be able to copy the complete disk in a single pass. If the system doesn't come up at all, the odds are good that have the MMU in wrong (**in which case it is dead**) or that you killed a RAM chip with static. If you can copy a disk, but not in one pass, odds are good that there is a pin that looks soldered, but isn't.

If your system doesn't work, there are alternatives to suicide. Look at the pins of the memory chips with the logic probe. Notice a pattern that appears on all but the power lines of the ICs. By looking at each pin of each IC, you should be able to find the IC that has the abnormal pattern. Once you have located the pin, you must figure out why the signal isn't there. Look for a pin that isn't soldered or for a bridge. Be on the look out for a crack in the traces on the PC board; we have seen this happen even though we didn't go near them for the modification.

Now that you're happy that everything is working, unplug everything and reassemble the machine. Reassemble the bottom RF shield to the PC board. (Or throw it away if you are worried about heat build up.) Replace the screws that secure the PC board to the bottom case, and install the upper RF

continued on page 156

Figure 8b



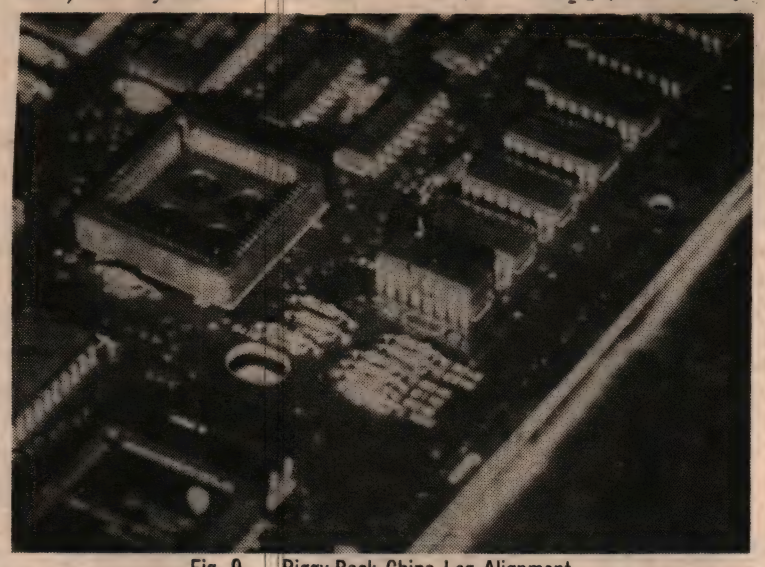


Fig. 9 — Piggy-Back Chips Leg Alignment

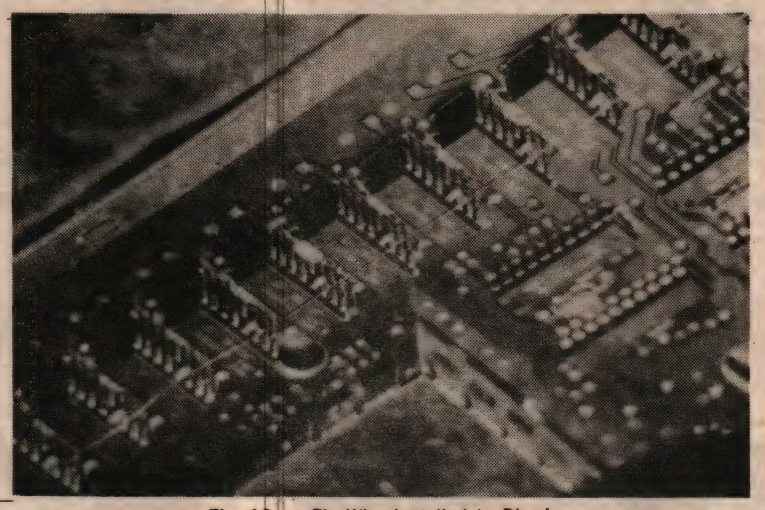
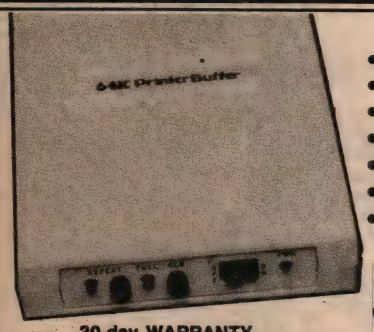


Fig. 10 — Fly Wire installed to Pin 4

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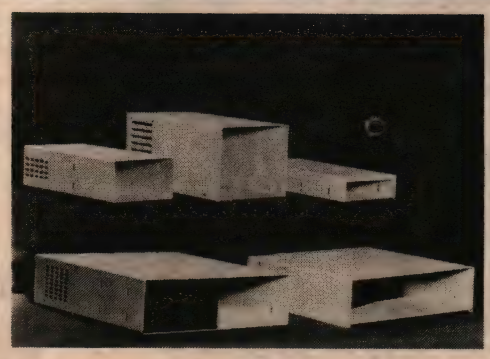
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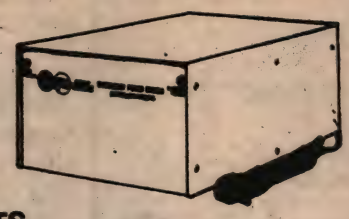
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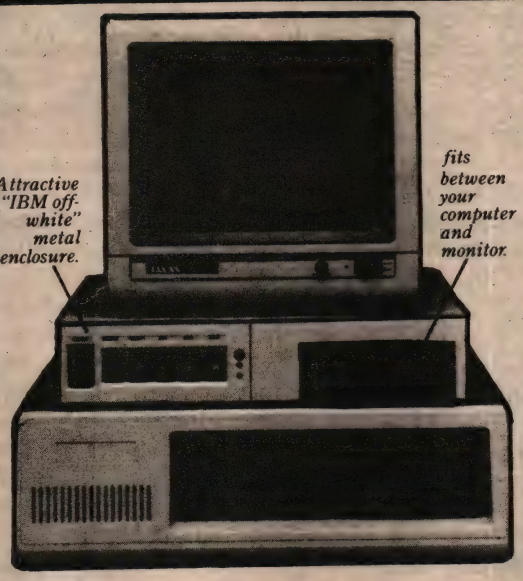
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The Artistic Atari

continued from page 44

done. However, instead of plotting all the points and then going back to draw in the lines, lets go ahead and use the K-line, or continuous line feature. This works the same as the standard line function except that the line doesn't stop when you click the left button, instead it continues on to the next point you stop the mouse pointer at and click the left button. Perfect for drawing graphs.

DEGAS also has a bunch of different line patterns although they weren't needed for the graph I was working on, and they are just great for doing multiple plots on the same axis. A good example would be comparing different year's sales figures, for example, 83 might be a dashed line while 84 can make up dots and 85 as a solid line.

Once the graph was done, I wanted to get rid of the grid I had set up for plotting my points. Again it was a simple thing to do with DEGAS. All that was needed was to overlay the grid fill pattern with a blank fill pattern. You can think of it as writing over the grid lines with the background color and effectively erasing them. The only problem with this is that it left little sections of the grid in the lettering in the title and on the axis. I first tried to "fix" this by carefully point drawing with the background color. This didn't work very well, I couldn't control the mouse finely enough not to mess up my letters.

Luckily I had taken the manual's advice and saved a copy of my work to disk before I tried to – fix" it. What was needed to clean up the problem was to use my magnify mode. This takes a 20 by 40 pixel section of the work and expands it to fill the entire screen. Then you can work with individual pixels with ease.

Now that everything has cleaned up to my satisfaction it was a simple matter to dump the graph to my printer using the print pic option. Currently the only printer driver is for Epson compatible printers. The manual promises that other printer driver programs will be ready soon and they will be made available in later versions of the program and possibly on Compuserve's SIG-ATARI. Registered owners will be advised when other disks are available. This will be great, since DEGAS really needs to be able to dump to a color printer.

This recap of my first session with DEGAS just hints at all the program's features, since I didn't even use some of the most powerful features. For example, the shadow option creates a shadow of border around any figure, angled in the direction of your choice, in the color you desire, and at a distance you specify. This option makes 3-D effects really easy, both on drawings and lettering.

DEGAS also creates circles, boxes, frames or disks, by having the user selecting only two points, the programs draw in the rest. For example, to draw a circle you only need to click the mouse on the center of where you want the circle. Then move the pointer outward from the center to define the radius. When the circle is the right size, click again and DEGAS draws it in.

I used the circle, shadow, and ray features to make some really nice 3-D pie charts. Rays work like other lines but they all have a common point of origin. These make pie charts like the ones I've tried, easy to do and they look great. I also used the polygon feature to do some bar graphs.

I've mainly stressed DEGAS business graphics capabilities because that's what I am most familiar with. But DEGAS is much more flexible, some of the art work that I've seen created with it is stunning. There are still a few features of DEGAS that I haven't mentioned, let alone explained in detail. Let me just say that half of the fun I am having with this program is in finding out what all I can do with it.

Not many of the software tools I use are really a lot of fun. Oh sure they do a great job, making my work easier and faster, and with fewer errors. I also have many games for my ST that are a lot of fun, but it's really nice to be able to do some productive work on my system and have a great time while I'm doing it. I really like this program, and recommend it to anyone who wants to try his or her hand at computer graphics. ●

Double Your Memory

continued from page 154

shield. Plug the keyboard in, put on the upper case, and replace the case screws. Remember that the long screws go in the holes along the rear edge of the case.

How do you get the best use of all this extra memory? We recommend a RAM disk program. This is a nice little program that takes a section of your RAM and makes it look like a disk drive to TOS.

You won't believe the performance improvement some programs show unless you have seen a RAM disk in action before. For example our compiler runs at least 20 times faster from the RAM disk than it did off the floppies.

We have seen two RAM disk programs; one is in the public domain and can be obtained from a users group or downloaded from SIG ATARI on compuserve. The problem with this program is that it works only on one meg machines and creates a fixed sized RAM disk (the same size as a single sided drive). The other one we have seen is the one we use. M-Disk from Michtron is our recommendation if you are in the market for a RAM disk. It allows you to create any size disk you want, and it will work on a standard ST. (But you can only create a RAM disk of about 120K unless you have done the memory upgrade.) M-Disk is $39.95 and is available in many computer stores.

If you wish to have your machine upgraded, but don't feel like doing the job yourself, contact the ST Users Group BBS at (305) 383-1413 for details on having Gary install the mod. ●

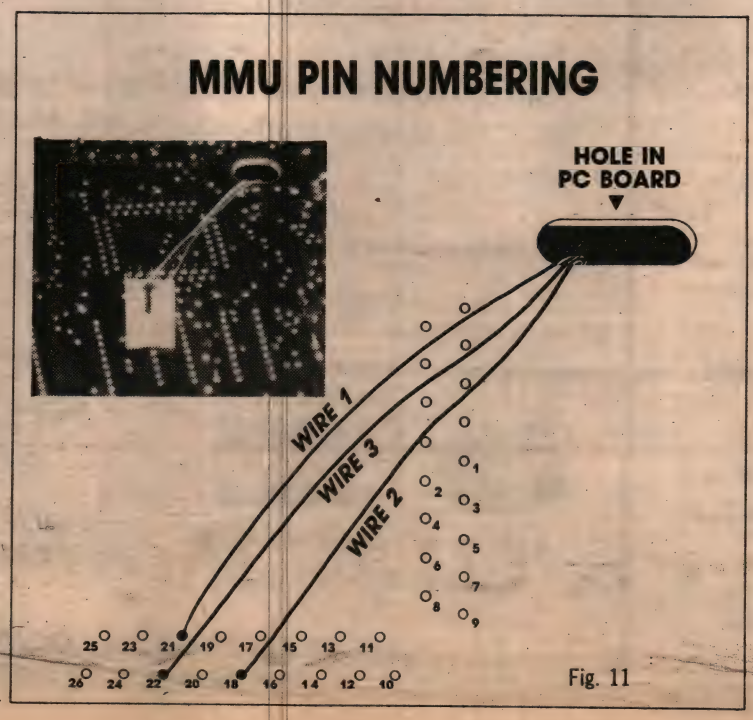


Fig. 11

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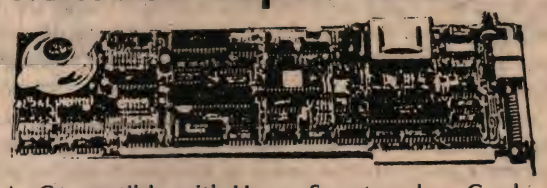
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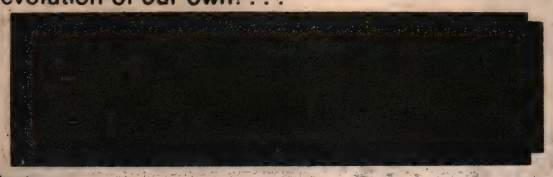
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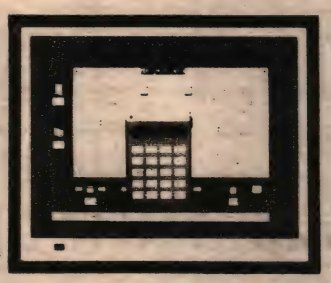
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Control GEM

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The first two lines identify what the program is doing, set the color parameters, and provide for a full output screen. The subsequent lines are the keys to entry into the control of the GEM's VDI. In line 30 the entry 11 tells the system that a circle is desired. The following poke control lines, then specify the parameters VDI associates with circle generation. After this the ptsin lines establish the X and Y coordinates of the center and the radius of the circle. Finally, vdisys(1) triggers actual execution of the VDI function.

It is evident that the entries through line 60 do all the preliminary work for generating our circle. Lines 70-90 establish the essential information on location and size, and line 100 implements the job of drawing the circle. For practical purposes, we then can draw a variety of circles by merely modifying our entries in lines 70-90. To convince yourself of this, I recommend that you enter the above program and then experiment with various locations and sizes of circles. (You can, of course, change the color parameters if you so desire.)

And An Ellipse

Well, if that were the limit of our capabilities, we would soon tire of the computer. Of course, we can draw a circle without using the VDI option. So, what else can this facility do for us?

Actually, it can do a great deal more than generate circles. But, that is an easy exercise to start with, and it provides the building blocks for other activities. For example, let's examine how we might draw an ellipse. See figure 2 and program on page 180.

Wallah! Not much different in appearance is it? Evidently the same basic Contrl parameter, 11, covers both circles and ellipses. However the parameters aligned with contrl + 2 and contrl + 10 have changed. These indicate to VDI that an ellipse is needed. And, although we locate the center as before, we now need to provide an additional radius to generate the elliptical shape. Otherwise the same basic pattern prevails.

As before, do generate a few ellipses scattered hither and yon over your screen, using different sizes. Lines 70-100 are the only ones that require changing.

A variant on this theme is possible with only a slight change in the program. We'll make this change and then produce a partial ellipse defined by starting and ending angle values. In providing the information to the VDI, the angles must be in such units that 3600 constitutes a complete circle. The entry in intin is the starting angle (0), and the value in intin + 2 is the ending angle (2400). Program 3 produces a pie that is roughly three quarters of an ellipse.

Old-Fashioned Straight Lines

A pattern for operating with the VDI is beginning to shape up. I'll return to this pattern and provide a simple matrix that correlates the desired graphic product and the appropriate parameters. First, though, we'll examine one more program that differs a little more drastically from the examples on page 180. See program 4 and figure 4 on page 180.

In this routine, we draw a sequence of straight lines between specified points. Again, there is a BASIC instruction that can also draw lines. But our concern here is less with the line than with the VDI implementation. When 6 is assigned to contrl it recognizes that a line is to be drawn, and a 3 in contrl + 2 confirms this. At this point, the VDI system knows that the ptsin entries will be X and Y coordinates.

Of course, we need not draw each of the objects above with individual programs. They can be integrated into a single program that will, for example, impose a circle on the ellipse, and an X-Y axis on the screen. The result is shown in program 5 and figure 5 on page 180.

As you can see, program 5 doesn't really introduce much that is new. Rather it chains together the ellipse, circle, and polyline into a simple routine. The polyline portion differs from the earlier one in that some of the lines overlap each other, but the procedure is the same as before. Admittedly, these particular routines can be emulated by some of the BASIC instructions provided. Nevertheless, they highlight the structure for accessing the powerful GEM VDI capabilities.

We Bar Nothing In Our Program

One additional illustration of the VDI capability is of interest. That is the bar chart. Here we still use the control 11, etc., used with the circle and ellipse. Contrl + 2 is set to 2. Contrl + 10 is set to 1, however. Then, in ptsin and ptsin + 2, we set one corner of our bar. The diagonal corner opposite this is in ptsin + 4 and ptsin + 6. That's it. Short, simple, and to the point. In our routine, we draw both a horizontal and a vertical bar. See program 6 and figure 6 on page 180.

From these programs a pattern for VDI usage should now be recognizable. Can we, however, build on this pattern? Certainly we can. All we need is information on the appropriate parameters to be used with the routine. Not to hold you in suspense, the table on page 180 constitutes a summary of such parameters.

VDI Parameters

VDI uses a set of Operation Codes (Op Codes) to specify the function to be performed. These codes range from 1 to 131. We have been using them in the simple programs presented so far in this article. For example, when we assigned the value 11 to our variable, contrl, we were specifying the op code for the VDI Generalized Drawing Primitive (GDP).

Within the VDI construct there is a secondary set of parameters called Ids. For the GDP, there are ten such Ids, each producing a different drawing. For example, Id 1 is used to identify that function that draws a bar. Id 2 is used for drawing an arc. Id 3 draws a pie shape. And so on for other shapes.

We specify these parameters by assigning them to contrl + 10. If contrl + 10 is set equal to 9, we would be able to draw a rectangle, with its surface filled with a selected colored pattern and its corners rounded. What do the other contrl values signify?

Contrl + 2 contains the designator for the number of vertices to be associated with the ptsin entries. Contrl + 6 establishes the length of the input array, intin.

These few contrl parameters allow us to designate what we want the GDP function to do for us. You might note that the initial contrl value is a reference address. Two bytes above this is the next contrl value. Two bytes above this is the next contrl value. Two bytes above this is the next, and so on. In other words, for the contrl, as well as for other variables we use, we are merely indicating the value to be input at an address displaced from the initial one assigned. Thus, when you set ptsin to a value, the value is assigned to an address. The value assigned to ptsin + 2 is assigned to an address two bytes away. And similarly for other entries.

The ptsin values are used to, among other purposes, specify coordinates. In the circle routine, they indicate the center of the circle. For a rectangle, they would indicate the initial corner and that corner opposite. Ptsin could be the initial x-value; ptsin + 2, the y value for the initial corner. Ptsin + 4 would be the x-value

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Applying The Atari

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Machine, was built around five machine language routines that enable the program to function quickly and effectively. The assembly listings of these routines are being listed this month for those of you who wish to study them, or to incorporate them into your own programs.

When *PixMix* loads the digitized watch picture (or any screen) from disk or cassette, it stores the data in a string (SCR$), rather than directly in screen memory. This allows the program to have continuous access to the original picture data, regardless of what is done to the picture on the screen (i.s. scrambling). Once the data is loaded into the string, the "STRING TO SCREEN" routine is used to transfer the data to the screen, leaving the contents of the string intact. See program 2.

The "GET SCREEN PIECE" and "PUT SCREEN PIECE" routines allow high-speed manipulation of the graphics screen. The "GET" routine picks up a 64 by 32 pixel area and stores it in P$. Conversely, the "PUT" routine transfers this area from P$ to a specified section of the sccreen. The two routines together allow *PixMix* to "mix up the pieces" of the screen, and enable you to pick up screen pieces and move them around with your joystick. See programs 3 and 4.

Pressing the space bar while solving a puzzle lets you see how the completed puzzle should look. This feature involves the "STRING/SCREEN SWAP" routine. Essentially, this routine simply exchanges the data saved in SCR$ (the original screen image) with the scrambled image on the screen. When the space bar is released, the swap routine is called again, bringing the scrambled image back to screen, and the completed puzzle image back to SCR$. See program 5.

When you solve the puzzle and press the START key, how does *PixMix* know you've solved the puzzle correctly? Once again the program refers to the original image data stored in SCR$, but this time through the "STRING/SCREEN COMPARE" routine. If the screen contents and the string data do not match, the puzzle has not been solved and location 208 ($DO) is set to one to flag this to the BASIC program. *PixMix* then generates its ominous, disapproving hum. On the other hand, if the

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at the opposite corner, and ptsin + 6 the associated y-value.

The intin variables relate to any integer values passed to the VDI routine. They could be used to indicate the start and end of an arc or of a pie- shaped graphics.

Parameter Matrix

There are other parameters that can be used with VDI, but these will suffice to illustrate some basic ideas. They support the majority of the GDP functions, which we'll now look at in the form of a matrix. The entries here cover only the GDP activities. A more extensive set can be found in the *GEM VDI PROGRAMMER'S GUIDE*. See Figure 7 on page 180.

Note that several entries have an * beside them. Where it appears, the first number is used to obtain an arc, the second to obtain a pie slice. The *2 is used with the ellipse column and implies, if no arc or pie shapes are desired the intin entries can be ignored?

The above entries, in conjunction with the programs provided, should allow you to explore the GDP function of the VDI. This is but a subset of VDI's total capabilities. An additional example, outside the GDP function, is given for drawing lines. It illustrates that the basic parameters still apply, but merely have a different connotation.

And Now To Application Environment Services (AES)

In using the AES, we go to an address for our control, identified as gb in the program. The address for the global array is accessed at gb + 4, and in and out entries as reflected in the program. The address references specify sets of pointers used by the system during processing of this program. And, of course, the x-, y-coordinates are found in the address contained in gintout + 2 and gintout + 4. Once our initial values are set up the routine is recycled. This is done by a call to parameter 79, which is the control parameter for obtaining the mouse state. As we move our mouse, we repetitively generate a new set of x-, y-coordinates, and then peek at them. The process here is a little slow, so move your mouse slowly. To get the displayed point to line up with the mouse indicator's point, we had to subtract 22 from the y-coordinate. See program 7 on page 180.

It seems an empty gesture to develop such a program and not demonstrate its qualities. Therefore I have exercised my hidden artistic talent and drawn a self-portrait that would grace the walls of any museum. No snide remarks, please! See figure 8 on page 180.

Summary

The GEM VDI capabilities can be accessed through the BASIC instructions. They provide an extensive set of functions not always available otherwise. They use a pattern of parameters that establish the resulting product. For drawing purposes, a subset, the GDP, is readily usable. The provided matrix covers the essential entries for GDP activity. ●

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real estate/mortgage banking services. Each analysis describes a property type, program structure, hardware and operating requirements, documentation, installation, technical and user support, price and terms, and program availability.

In FIGURE 1 we have presented a bibliography of relevant books in print. FIGURE 2 is a bibliography of relevant magazine articles. Both of these lists were acquired from an online bibliographic database available through a service called DIALOG Information Services, Inc. (Such searches may be expensive or inexpensive depending on the database accessed and the information required. In this case, the cost was approximately $150.00)

Using data which is available online from the comfort of the chair in front of one's personal computer is a very underutilized facility. FIGURE 3 is a list of online data services which have been categorized as real estate industry sources of information by "Data Bases for Business: Profiles and Applications" (Van Mayros and D. Michael Werner; Chilton Book Company, Radnor, PA, 1982). The sources are diverse and may or may not be relevant to any but a small sector of the industry.

Others are also available which are not listed here. For example, Matthew Lesko lists in "The Computer Data and Database Source Book" (Avon Books, New York, 1984), the "Real Estate Information System Network". The subject of this online source is U.S. commercial and industrial real estate. The source of data is real estate agents and brokers. The database contains change property data from throughout the U.S. It covers larger commercial and industrial properties with data on size, type, building age, number of buildings, number of stories, land mass, rental area, price at sale and rental, net operating costs and various other characteristics of the property. All sold properties are included. The producer is the National Association of Realtors, 430 N. Michigan, Chicago, IL 60611 (313-329-8200). The information is available on the Real Estate Information System Network at an approximate cost of $50.00 to cover a one-time fee, $10.00 monthly, and $11.00 per connect hour plus an additional minimal fee.

There are many software guides available at the book and magazine stores. Keep in

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screen does match the string, the flag is left at zero and the congratulatory tune is played by the BASIC program. See program 6.

These five routines are the vital organs of *PixMix*. BASIC serves as glue to hold it all together. *PixMix* serves as a good example of the power and flexibility of the BASIC/machine language combination.

Operating System Keypad Driver

Ever since the CX-85 keypad drivers for BASIC programming were published in the July and August 1985 issues, I've been unundated with requests for drivers to work with just about every commercial software product imaginable. Unfortunately, finding a place in memory for the kaypad driver is not easy; each commercial program would have to be looked at as an individual case. But XL and 130XE owners will be happy to know that the extra RAM in your machines ("underneath" the OS ROM") is the ideal place for such a keypad driver. This is precisel where we install this month's keypad driver.

Type in the *"CX-85 Driver Creator"* using *Program Perfect* and SAVE the program to diskette. If you're not using *Program perfect,* recheck your typing several times, since one small mistake in the data statements can blow the whole program. See program 7.

Now place a formatted diskette (containing DOS files) into the drive and RUN the program. You'll be instructed to press the START key to write an AUTORUN.SYS file — when you're ready, press it.

When the "COMPLETED" message is printed, you're finished. You now have keypad driver that takes up none of your Atari's normal memory and will work with some commercial software.

Using The New Driver

The best way to test out the new driver is by booting up a BASIC disk. Turn off your computer and insert the keypad driver diskette into the disk drive. Now turn on the computer. If everything is O.K. you'll soon get an "INSERT PROGRAM DISKETTE AND PRESS SELECT" prompt. Replace the keypad driver with a regular BASIC diskette and press SELECT. The computer will reboot, and when finished, your Atari will work normally with one exception: It will now respond to a CX-85 keypad plugged into joystick **port 2.** Joystick port 2 was chosen instead of port 1 since many readers wrote that they like to keep a joystick plugged into port 1.

Using Commercial Software

To use the keypad with a commercial product, boot up the keypad driver diskette as described before and remove the diskette. Now place the program you want to load into the drive. If BASIC must be disabled, then hold the OPTION key down while you press SELECT. Otherwise, just press SELECT. The Atari will simulate being turned off and then on and the program should load.

In most instances, you should be able to use the keypad with a commercial software product, but there are exceptions — namely, some heavily protected software and programs that read the Atari's keyboard register directly, bypassing location 764. In these cases, the program will either not run, or will not respond to the keypad.

I'm asking readers who try this keypad driver with commercial programs to please write and let me know which of your programs are compatible with the driver and which aren't (you could even jot the names down on the postcard if you're entering our drawing!) I'll report the findings in a future column.

How It Works

When the keypad driver is loaded into an XL or XE, it transfers the Atari's ROM operating system (OS) into the RAM that lies underneath it. Next, the actual keypad

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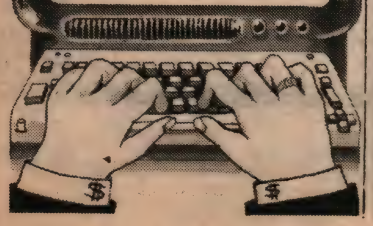
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mind that entries are solicited from the marketplace and the descriptions are usually written by the provider of the software. FIGURE 4 is a list of real estate software for IBM PC's and compatables and Apple II and Macintosh computers. Software for other computers is also available. The Harold T. Jamber, Jr. "Real Estate Applications Software Directory" mentioned later in this article is a good source for those with other hardware configurations.

Professional Organizations: A Source not to be Overlooked

William Mucker, Software Representative, Realtors National Marketing Institute (RNMI), Chicago, Illinois, is a friend indeed to those who are trying to select a computer system for real estate purposes. Bill's area is a member service which reviews and recommends software packages for all aspects of the real estate industry.

Reviewers are recruited from members who have a Certified Commercial Investment Member (CCIM) designation. There are currently 2000 of these and 8000 candidates. To obtain a CCIM, one must complete a 5 week training course over a 5 year period, sell $3.5 million of commercial real estate, and pass an examination among other requirements. Quarterly updates are made to software lists which also appear in the organization's quarterly magazine"Commercial Real Estate Investment Journal". Outside members can subscribe to the publication for $24 a year.

Bill came across as a high powered microcomputer consultant. "You shop for software first," he said. "Too many people come to me and ask me what hardware should they buy. Not only do we not endorse a particular brand of hardware, but we tell members that they are not approaching the problem correctly. Incidently, today we find that after a member selects their software, they usually end up with an IBM-PC or compatible."

Not only do members of RNMI have a knowledgeable person in Bill Mucker to discuss their computer problems with, a person who had a variety of reference and source lists available to give over the phone for this article, but they have a trade group which actually endorses software products. There are six products endorsed out of possibly hundreds which have been reviewed. RNMI has marketing agreements with the six software vendors and the products may be purchased through them.

In the investment analysis area, three products are recommended. The low-end product is RealCalc from Jara Software in Dayton Ohio. It sells for $195.00. The high-end software, at $2995.00 is The FinSim II from Grant Systems Inc. in Houston. The middle of the line is The Palmer Berge software line at $595 a module.

In the area of seller's analysis, Charles Freedenberg's Real Estate Software from The Taftcameron Co., priced at $189.00, is the choice. They are in Beleview, Washington. In the accounting area, endorsed is The Grant Thornton Co.'s General Business System for Microcomputers. It is a fully integrated accounting system for real estate brokerage. This firm is located in Sacramento, CA and offer 35 hours of consulting time and training for each of their accounting modules. The prices vary according to combinations of modules purchases. If you were to purchase the general ledger module alone, it would cost $4525.00.

Finally, for database management for the real estate office, REALBase is the preferred choice. The initial database which provides for storage and maintenance of prospects and properties sells for $2595.00. Any of a long list of additional modules can be added such as word processing, sales management, market investor, comparable sales, list processing, research library, or a financial reporter which is similar to a general ledger program. REALBase is located in Clearwater, Florida.

Does Bill have a message for those who are thinking of computerizing? "Don't be afraid of stepping into computerization. It will have to be done sooner or later. Be an informed buyer. Education is the most important thing to seek out. Take a class."

Are there more Bill's out there in more organizations like RNMI? Probably. FIGURE 6 contains information extracted from Barron's "Real Estate Handbook". Compiled by Jack C. Harris, Ph.D., and Jack P. Friedman, Ph.D., C.P.A., S.R.P.A. as part of Barron's Educational Series, this publication has in one 569 page volume a Real Estate Glossary of 1300 key terms and the 8 most important financial tables for realtors. The glossary contains a huge number of institutes and associations having to do with the real estate industry. The most relevant of these have been culled from the Handbook and are listed alphabetically. They are valuable sources of information and some may be involved in the problems of computerization much like the Realtors National Marketing Institute.

What is the Most Important Consideration in Selecting Vertical Software Products?

Support is probably the most important thing to look for. Since there will not be a huge base of users at your local computer club using the package you have selected, you must rely on the training and support of the software house selling the product.

The Industry by Segment — An Overview

Harold T. Jambers, Jr. in"Real Estate Applications Software Directory (publication No. 337, Texas Real Estate Research Center, Blocker Building, Texas A&M University, College Station, TX, 77843, 1984, 331 pp.)), discusses over 1000 real estate computer programs from 277 software vendors. Information on each vendor consists of name, address, telephone number, software packages offered with brief descriptions and associated costs, compatible hardware, operating system and program languages. A topical index identifies 39 real estate topics such as brokerage accounting, appraisal, investment analysis, listing management, property management, and the like. We have chosen a slightly less ambitious approach here. We have identified three main areas for discussion. These are:

- real estate sales
- property management
- appraisal and investment-analysis

Real Estate Sales

The bulk of confusion, the biggest resistors to change, and perhaps the greatest potential for unique data processing solutions can be found in real estate sales. Chris Markatos Associates is a real estate agency which services all of Northern Westchester, Putnam and Southern Duchess counties in New York State, north of New York City. Markatos has two offices in upper Westchester County, New York and has been in the business for 31 years. Francis J. Cassidy of Chris Markatos Associate's Mahopac office speaks about the problems. "There is a real lack of familiarity with what is out there, and I'm not really sure salespeople are that interested." Frank described the business as being staffed with salespeople who are really independent contractors. The agency is not going to go to the expense and trouble of putting a computer on every desk. The nature of the business, especially in suburban residential sales, is still rooted in the "old ways" and even if the agency were to provide this new tool, it may not be used. "Many of the old-timers are intimidated by the computer. The younger salespeople are more willing to experiment."

Markatos as an agency,seems to prefer the personal touch. For instance, for mortgage analysis, rather than have salespeople sitting down at a computer doing the analysis, they have an in-house mortgage person. "This has tremendous advantages" states Frank. "Salespeople are not trustworthy individuals to people who are trying to buy a home. People do not want to divulge their financials to the salesman and often do not tell the whole truth. If they are turned over to the mortgage person, however, who knows all the questions to ask and is able to impress upon them the need for truthfulness, then they more freely disclose those alimony checks, for instance. This, of course, is to everyone's benefit because the mortgage person can give them a true idea of how much money they can expect to borrow and therefore how expensive a piece of property they can look at. No one's time is wasted on false expectations."

"The buyer has a body to relate to and can rely on this person's contacts and expertise in dealing with those who lend money," continues Frank. "The mortgage person also is tuned into the volatility of the market, is aware of the direction and speed of movement of rates and where to find innovative mortgage programs to suit an individual's needs."

When asked about computerized access to the multiple listing services (MLS), Frank said that this is certainly a benefit to an agency and Markatos does subscribe to one of these services. The multiple listing services provide information on all properties on the market. The hard copy books and daily change sheets that are mailed also contain a picture of the property. Multiple listing services may or may not provide pictures online. Neither of the two Westchester County services do, citing cost as the reason.

Markatos is set up with one machine which has access to one of the two competing services supporting northern Westchester County. Having a computer sitting there adds prestige to the office and serves as a significant sales tool. "You have to remember, however, that each office must carry a share of the cost when a service like this is subscribed to." Frank points to the benefits. "The information on a listing can be two weeks old by the time you get it in the mail. With the computerized listing, as soon as a price or status of a property changes, it can be entered into the computer and all subscribers to the service will have this information."

Markatos, however, can be considered computer progressive by simply being hooked online to the MLS. Rosalind Bauer of the Multiple Listing Service of Northern Westchester stated that only 40 of their 110 clients take advantage of the online service. Rosalind cited fear of the personal computer terminal and cost although she felt that being able to immediately obtain the prices of sold items for analysis, having the listing book, comparables and appraisals online is certainly worth the additional cost. Ms. Bauer did not wish to discuss the actual cost details with Computer Shopper.

The competitive differences between MLS products in the same area would have been interesting to explore. However when the competition to MLS of Northern Westchester was contacted, they did not show any interest in talking to Computer Shopper about their services. This outfit calls itself Westchester MLS and is the one which services Markatos.

Other agencies in the same suburban area as Chris Markatos take a more aggressive role in providing the new technology throughout their offices. Bixler Realtors, for instance, provide PC's on each secretary's desk. Lilian Youngbluth who is Bixler's Comptroller, described their computerized network which had its beginnings 6 years ago with a hookup to one of the multiple listing services. Bixler today subscribes to both.

Until recently Bixler, whose main office is in Katonah, New York and whose 7 offices in Westchester County span an area which extends from Pleasantville to Somers, used what Lil describes as "programmable smart dumb terminals" to hook into the MLS for the sales counselor's use. In the past 6 months the environment has changed dramatically.

A network was installed which included an IBM-PC on each secretary's desk which has access to the MLS for inputting of listings and data retrieval. Word processing is also done at each of these locations. The software products used are dBase III and Framework. To support these activities Bixler

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hired an in-house computer programmer.

Lil did not mask her excitement in describing some of the kinds of things people at Bixler are able to do. "All the newspaper advertisements are put together at the branches by the secretaries and then telecommunicated to the IBM-PC/XT at headquarters. The ad department puts them all together and they are then picked up by the media."

They have an in-house program which, when an offer is accepted, prepares an information sheet which is transmitted to headquarters, edited on the XT and then communicated to an IBM System 36 for cash flow reports and anticipated income for sales counselors and officers. "Each office manager knows all the figures for budgeting and expense analysis," Lil explained. The Bixler System 36 has 4 work stations and two printers, one of which is letter quality.

For accounting, they are using a package recommended by IBM called DMAS. It is a generalized accounting package rather than one specifically for the real estate industry. "We really couldn't find a real estate accounting package which would work for us. They are mainly for small firms and don't track things like branch office expenses." Other work that the computer is doing for Bixler? "For salesmen and for advertising, we gather information on buyers (where customers are coming from, how old they are and if they are first time house buyers) and sellers (how old they are, how long they have lived in the house, what advertisement they saw and where they are going)," Lil continued.

Customer information can be stored and examined periodically to determine if contact should be made. Each office has a personal online mailbox so that offices are kept in close touch with one another. If a client is being serviced out of the Somers office and they appear in another office, that office will know this information. Dan Bixler can send messages to his office managers only.

Does Bixler have a mortgage person? "No," responded Lil. "We are tied into a private mortgage company, Empire Finance, through the computer. If the customer is truthful and there is nothing very unusual about his financial situation, we can get a loan commitment very rapidly, often within 24 hours." Empire is another Bixler enterprise.

When asked if Bixler tries to keep all this information to themselves in order to acquire a competitive edge, Lil said, "Mr. Bixler has shared all of the statistical data with the media. He feels that making these statistics public may increase computer use and this would be good for Bixler and the industry."

It is perfectly obvious that a directive to utilize-state-of the-art technology at Bixler comes from the top. Dan Bixler has provided unlimited training and time to bring computerization to his organization. Lil states that "Computers are here to state and they are a great tool. We want to spread the word because the more real estate offices that use computers, the better the system is because there will be more information quicker."

Sales packages should include the ability to maintain agency listings by broker, geographic region or by any other desired criteria. Matching interests of clients with available properties is a nice sales tool if current, past and prospective clients are maintained. Libraries of standard forms should be available and the ability to do personalized mailings to selected customers about general issues or specific properties can be provided. Lil Youngbluth mentioned, for instance, that many of Bixler's salespeople have PC's at home and do many of these types of tasks from their homes using a variety of software products.

Other capabilities to look for are tools to qualify buyers and to calculate mortgage payments on new loans, assumptions, federal and veteran's mortgages and others. Rent-versus-buy and cash flow analysis is usually available as is investment criteria for income properties and ties to banks for current interest rates. Mortgages can be analyzed breaking out amortization and interest payments.

Property Management

Susan Newman, Vice President, SKS, had lots of horror stories about property managers who are not using computers. She knows a property manager who keeps all his cash receipts on a big blackboard. When a tenant pays his rent, he puts a mark on the board. He knows that he's supposed to collect some amount, say $50,000 each month. If the blackboard for the month shows a total of $40,000 or more, he says he is OK and doesn't worry about the rest. Most of it will come in late. As time permits he can go after the deadbeats. "Many of these firms started with an individual or family who invested in a little real estate, grew to a small mom-and-pop operation and then exploded into a business which no longer could be truly controlled manually," Susan explained. "These people do not know where to go or what to do. They must in many cases rely on the honesty of their tenants to pay what is due them."

Accounts receivable, delinquencies and financial reports are not the only problems. If it were only that simple. With each lease being a different deal, there are rent increases, varying rent due dates, lease expirations to be kept track of as well as tracking and allocating negotiated escalators for taxes and operating expenses and hundreds of other types of payments and concessions, some of which are recurrent and others which are not. Each property should have a separate chart of accounts in its general ledger. There are a multitude of schedules to be produced including depreciable assets by various methods.

Susan Newman also voices concerns about those who are using computers. She has seen how reluctant people are to use them and how much difficulty they can have understanding them. Susan explained, "Each tenant has a different deal. Both true and projected information must be maintained for accounting and planning purposes and to be able to anticipate our financial position at any point in time. One of my big concerns is that someone will enter one wrong thing and the whole budget will be out of whack."

Susan cautions property managers about selecting a software product. "Too often there is an advertisement for a

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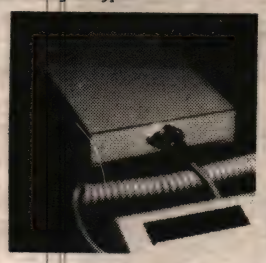
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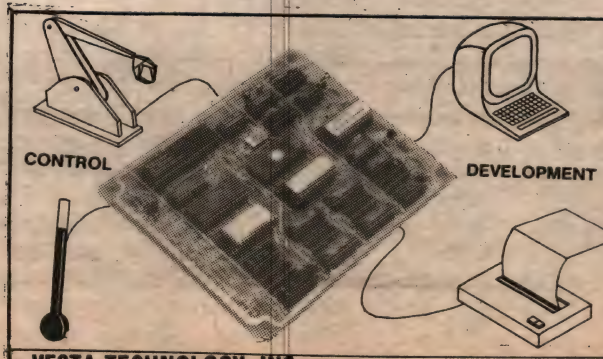
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product that sounds interesting. You call the telephone number in the ad and it turns out to be some little company in California, a one-man shop run by Joe Smo and his wife answers the phone. Then there are the $2500 packages which will manage security deposits for 200 apartments. Who needs it? How many individual $2500 packages are you going to buy to handle all the complicated aspects of this business?"

For Susan Newman, automating the accounting function is something she must do, alone or with the help of a computer consultant. She cannot wait until the products get better and the prices come down. In what other areas of the property management business would she like to see computer support? "I would like to see lap tops in the field for such work as due diligence. When a property is being purchased, someone has to go out and interview all the tenants to gather information about their base rents and all other aspects of their deal with the landlord. This information could be entered into the computer right on the spot using a database manager where each field appears on the screen like a form and is filled out by the information collector. A less skilled person could then be sent to collect the information and once collected, it could be transferred automatically into the main computer, thus saving the transcribing effort, the inability to read the field person's handwriting, and all those types of problems."

In the acquisitions area, Susan feels that much more use could be made of computers in making the buy/not buy decision. Modeling is important here. She quickly points out, however, that the people who are involved in this aspect of the business are not generally oriented to a computerized approach to acquisitions. These folks, much like those in the real estate sales sector, rely much more on gut feelings, personal contacts, what is happening in the market, or what the interest rate is at that moment. She feels, however, that a lot of support for decision making can be gotten from computer modeling. "All the information about a building, for instance, could be put together in a computer where assumptions could be make about the financing, for instance, and other variables in determining whether it is a good deal."

Appraisal and Investment-Analysis

If computerization of the real estate industry has any one area which appears to be moving in all the right directions, it is in the area of appraisal and investment analysis packages. Is it not interesting that the advent of microcomputers as a viable business tool was also in the analysis area, with VisiCalc in 1978? Once again, the basis of the analytic work done by the computer is on stored information. Information relating to individual properties (descriptive, historical, financial), individual leases (inception and expiration dates, escalator, options, special notices, non-recurrent and recurrent charges) and portfolios (number and type of properties, geographic distribution, value, history) must be collected and entered into the computer. If property management accounting is required in addition to investment analysis, an interface between the two systems would eliminate any need to enter information more than once. It could flow through the entire system.

With all of this information in a form which can be manipulated, the tools are then needed to analyze the performance of portfolios, individual properties for current and estimated cash flows, operating performance, capital investment, debt service, gross revenue, internal rate of return, financial-management rate of return and any unique modeling the individual investor may have in mind. Perhaps multiple regression analysis is desired or stepped-up income or accelerated cost recovery. A spreadsheet program or an interface to the more popular off-the-shelf spreadsheet programs should be a part of the package so that any unique analysis not provided by the system may be readily done on information which has already been entered into the system.

John Berge, Vice President of Palmer Berge Software in Seattle, Washington, who produces the cream of moderately priced analytic software for the real estate industry, says that "Buyers and sellers are demanding computer support. Pension funds and large corporations as well as the private investor feel that a computer will allow them to better deal with the great risk associated with what is an extremely volatile industry. With computer analysis they can get a handle on the worse case as well as the best case especially in the area of financing structure. This provides them with a greater comfort level."

John realistically portrays the inborn fear of the unknown and the intimidation factor that haunts those who should be utilizing computerized analysis tools. "Many of these people are successful doing their thing using the old brick and mortar approach and they've been successful doing it this way for many years. They use the 'seat of the pants' approach, so to speak." John also states that to do a comprehensive analysis of property and financial structure in today's volatile marketplace almost requires computerized assistance. "Resistance to change in this market is breaking down rapidly," John told us. "People are losing ground on their competition and when we show them that our product can pay for itself overnight, the resistance breaks down rapidly. We're also seeing a much younger group looking at analytic software and there are less computer orientation problems with this group."

The software sold by Palmer Berge Software is not new. It has been in existence since the early days of microcomputing. The original market for their products was primarily Savings and Loan Associations. As the products developed along with the microcomputer industry, their client base broadened. Today Palmer Berge Software for real estate investment and financial analysis consists of 5 applications modules consisting of 20 programs. The market extends to commercial real estate brokers, mortgage bankers, trust departments, real estate loan departments of commercial banks, and savings and loans and their service organizations. Their software supports most microcomputers including IBM-PC's and compatibles and any CP/M80 or 86 machines. The Apple Macintosh is not supported. A pro-

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totype of a syndication package is planned for release during the fall of 1986.

When asked how they market their products, John said, "Up until now we've used hands-on seminars as our primary marketing method. 8000 people went through our seminars. In 1986, however, we are changing this. We are going into the retail computer store." Not only are they going into Microage and other retail establishments, but in February, 1986, Palmer Berge Software will appear in the IBM Product Centers. Each of 5 applications modules will retail for $595.

John stated that at Palmer Berge Software they feel that the only way for computer stores to survive is to support vertical markets. "A computer store can adequately support from 4 to 6 vertical markets and we have a distinct advantage. 9 out of 10 people coming into a computer store seeking vertical market software are looking for accounting systems. It's very difficult for the salesman to get motivated to support an accounting system. In real estate it is different. Almost everyone gets involved in the industry at one time or another and they are all involved in financing. Therefore, it is very easy to motivate the computer store salesman to learn and support the packages we offer because they will want to use them for their own purposes." John also feels that Lotus 1-2-3 is not a cureall for everybody. "There are many people who cannot design spreadsheets and complex formulas who are able to use a product which has been designed for a specific application and provides all the cues that the user needs to do his work." An interface with Lotus 1-2-3 and other spreadsheet programs, Wordstar and dBase is provided, however, via an ASCII file structure from the Berge software. John feels that 90 to 95% of what has to be done analytically can be done in the Berge software. If desired, information can be transported to other systems to do the remainder.

"Support is the key," John emphasized. They plan to provide extensive support and instruction on the industry to dealers who carry their products. They currently provide both technical and conceptual support directly to individual users through a toll free telephone and newsletters. In the past 18 months they have distributed three updates to their software to cover new tax laws. They will provide updates within 30 days of the release of new IRS guidelines.

"The National Association of Industrial and Office Parks reviewed three of the real estate investment products and ours came out on top," John told us. It was through John Berge that were found some of the sources of real estate software information included in this article. Both the Realtors National Marketing Institute and the Real Estate Securities and Syndication Institute endorse Berge products. With the former, Berge software is one of six endorsed; with the latter, four products were originally endorsed. The endorsements for all but the Berge products were removed prior to the computer area of the organization being disbanded. These organizations are educational arms of the National Association of Realtors and have done a large amount of research in the area of computerization for the real estate industry.

Where Do We Go From Here?

The message from all corners seems to be simply to get going. Computers are here to stay. They will make work easier, people more productive and efficient. They will help you make money.

Figure 1

RELEVANT BOOKS
SOURCE: Books In Print – R. R. Bowkler Company New York, NY, 10036

Supplier -- Dialog Information Services, Inc, File 470:BOOKS IN PRINT - 1490-1985/ DEC. (Copr. R. R. Bowker Company 1985)

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Figure 2

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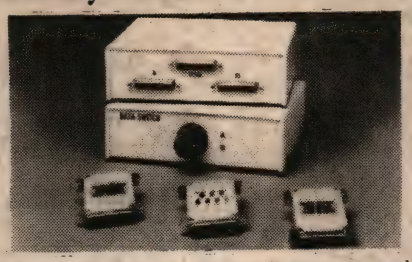
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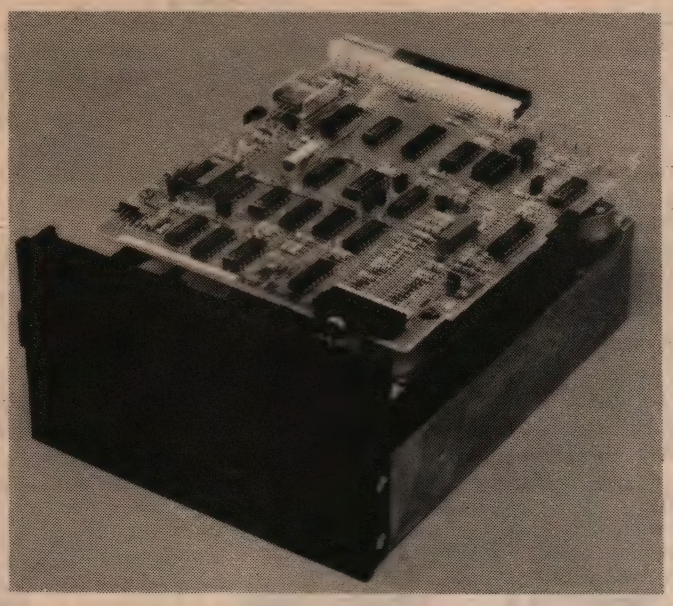
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continued on page 172

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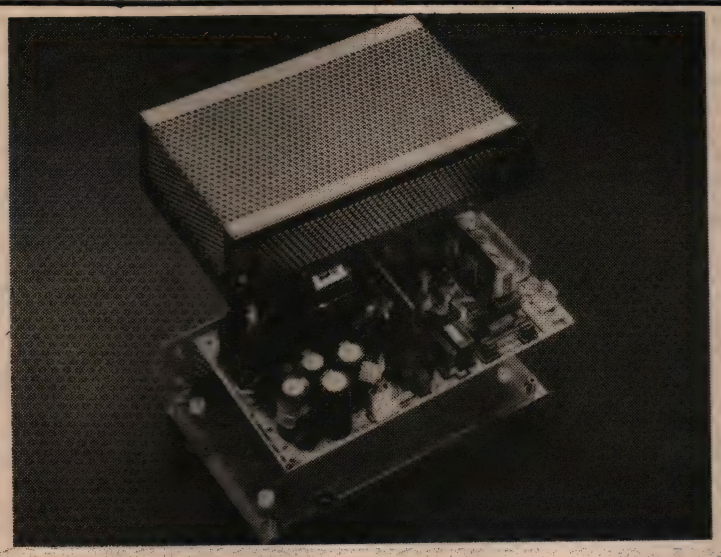


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Real Estate
continued from page 170

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Figure 3

ONLINE DATA SERVICES

The following online databases are categorized as real estate industry sources of information by Van Mayros and D. Michael Werner in their book"Data Bases for Business: Profiles & Applications"(Chilton Book Company, Radnor, PA, 1982).

Artbibliographies Modern
Producer: ABC-CLIO, Inc., Riviera Campus, 2040 Alameda Padre Serra, Box 4397, Santa Barbara, California 93103, (805) 963-4221
Data source: ARTbibliographies Modern print (books, dissertations and articles).

Size: 51,564 records

Maintenance: Approximately 8,000 records annually.

Primary subject: General Management.

continued on page 173

IBM PC COMPATIBLES 640K



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1-800-351-7832 - OUTSIDE CALIFORNIA
(213) 424-1172 Call Collect
SHIPPING 5% OF ORDER (Minimum $2.50) PLUS $1.90 C.O.D.

Real Estate
continued from page 172

Profile: Maintains citations and abstracts of books, exhibition catalogs, dissertations, and articles related to modern art ad design. Coverage period dates to the 19th century art history and media. Covers the fields of art history, biographies of artist an the various artistic media.

Applications: New corporate architectural designs; art/media planning.

Geographic coverage: International.

Time coverage: 1974 to present.

Online vendor(s): DIALOG Information Services, Inc.

Boeckh Building Cost System
Producer: E.H. Boeckh Company, Post Office Box 664, 615 East Michigan Street, Milwaukee, Wisconsin 53202, (414) 271-5544, (800) 558-8650

Data Source: Boeckh Building Valuation Manual.

Size: 30,000 cost items.

Maintenance: Monthly.

Primary subject: General Management (real estate and building trends).

Profile: Provides access to cost estimating reports for residential, commercial, industrial, and institutional buildings. For a residential report, the user inputs zip code location, basement availability, ground floor area, number of stories, material for exterior walls, occupancy type, number of stories, and gross floor area. Includes both current and historical costs.

Applications: Construction valuations; cost reporting.

Geographic coverage: U.S. and Canada

Time coverage: Latest ten years.

Online vendor(s): ADP Network Services, Inc., E.H. Boeckh Company, General Electric Information Services Co.

Citibase
Producer: Citibank, Citibase Economic Database
Post Office Box 5294 FDS Station
New York, NY 10150
(212) 559-5312

Data source: Bureau of Economic Analysis (e.g. from Survey of Current Business and Business Conditions Digest), various other macroeconomic series.

Size: 4,500 time series.

Maintenance: Daily to Monthly depending on on-line economic service.

Primary subject: Banking, Economics, and Finance.

Secondary subject: Multidisciplinary.

Profile: Maintains time series pertaining to the U.S. economy. Covrage includes national income; product accounts; U.S. international transactions (e.g. imports and exports); plant and equipment expenditures; capacity utilization rates; manufacturing and trade; industrial production index; housing and construction starts; price structures (e.g., producer price index and consumer price index); population, earnings, employment; finance (e.g. interest rates, money supply, foreign exchange rates and profit statistics).

Applications: Economic market analyses; forecasting modeling; various industry-segment analyses.

Geographic coverage: Domestic.

Time coverage: 1947 to present.

Online vendor(s): ADP Network Services, Inc., Citishare, CompuServe, Inc., Computer Sciences Corporation, The Conference Board of Canada, Control Data Corporation Datacrown, Inc., G.CAM, General Electric Information Services Co., Informatics, Inc., Massachusetts Institute of Technology, Proprietary Computer Systems, Inc., Rapidata, Inc., SIA Computer Services, STSC,Inc., Sun Information Services, Time Sharing Resources, Inc., Tymshare, Inc.

Citibase Weekly

Producer: Citibank, Citibank Economic Data Base, Post Office Box 5294, FDR Station, New York, NY 10022, (212) 559-5312

Data source: Federal Reserve, American Metal Markets, U.S. Department of Commerce and U.S. Department of Labor.

Size: 400 time series.

Maintenance: Daily.

Profile: Maintains approximately 400 weekly time series pertaining to the U.S. financial, economic, and employment data. Coverage includes large commercial banks (e.g. money supplies, financial condition, reserves and deposits and other components); Federal Reserve bank credit, yields on government securities, yields on corporate and some utility bonds, N.Y.S.E. daily volume index, Standard & Poor's 500 composite index and index of 400 industrials. This data base also maintains related data on commodities, production and unemployment rates, numbers, and claims.

Applications: Market analysis; economic and/or product forecasting.

Geographic coverage: Domestic.

Time coverage: 1980 to present.

Online vendor(s): Citishare
CompuServe, Inc.
Rapidata, Inc.

Cost Forecasting Data Banks
Producer: Data Resources, Inc. (DRI)
29 Hartwell Avenue
Lexington, Massachusetts 02173
(617) 861-0165

Data source: DRI costs forecasting data from several journals and government publications.

Size: Several time series.

Maintenance: Monthly, Quarterly, and annually.

Primary subject: Banking, Economics, and Finance.

Profile: Maintains a set of data bases designed to offer data on construction and other industries earnings, production, expenses, salaries, labor statistics, inventories, import/export price indices by commodity, lead-times, and related concepts of construction and other industries. The international data banks contain wholesale price, import price, export price and earnings indices by country for Japan and four European nations: Germany, France, Italy and the United Kingdom.

Applications: Industry projections and analysis; estimating new capacity expansion costs; timing orders for long-term projections.

Geographic coverage: United States, United Kingdom, France, Germany, Italy and Japan.

Time coverage: Varies by series.

Online vendor(s): Data Resources, Inc.

Cost Programs
Producer: Marshall and Swift Publication Company
1617 Beverly Boulevard
Post Office Box 26307
Los Angeles, California 90026
(213) 624-6451
(800) 421-8042

Data source: The Marshall and Swift Residential Cost Handbook, Marshall Valuation Service, and the Valuation Quarterly.

Size: 100+ various building occupancies.

Maintenance: Monthly.

Primary subject: General Management (real estate and building trends).

Profile: Maintains data for residential building costs (components) on approximately 100 building types. These costs cover a wide range of residential , commercial, industrial, and government buildings. Cost reports can be generated for buildings in each type of occupancy using simple square foot or a segregated cost format. Data may be adjusted to fit different local areas and depreciation schedules.

Application: Users may enter proposed residential building characteristics and the data base system will format a valuation and replacement cost report.

Geographic coverage: Domestic.

Time Coverage: Most current month.

Online vendor(s): Marshall and Swift Publication Company.

Dodge Construction Analysis System
Producer: McGraw-Hill Information System Company
F.W. Dodge Division
1221 Avenue of the Americas
New York, New York 10020
(212) 997-1221

Data source: Dodge Division field surveys, reports and contacts.

Size: One-half million cross-classifications of construction data.

Maintenance: Monthly

Primary subject: General Management (real estate and building trends).

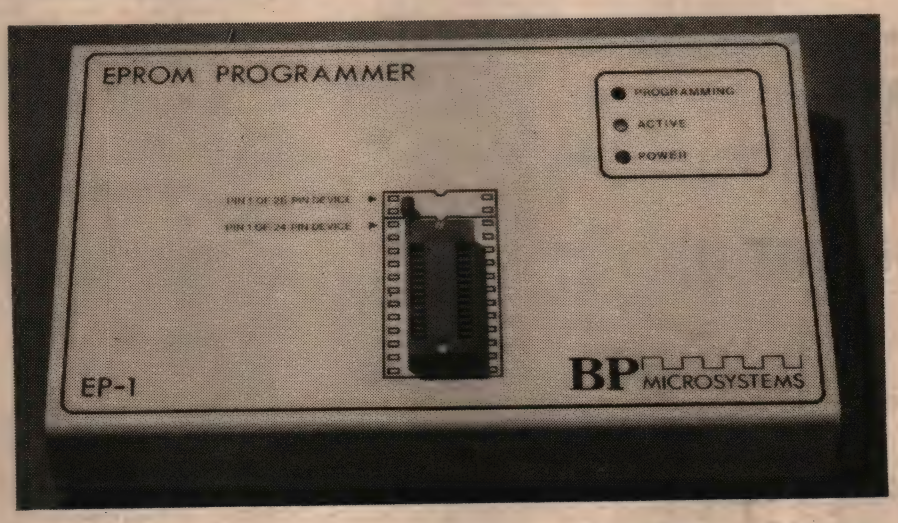
Secondary subject: Industrial and Manufacturing Planning.

Profile: Maintains a wide variety of highly specific building statistics.

continued on page 174

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Am2716	27C64	R5213
Am9716	87C64	R52B13
Am2732	27128	R52B33
Am2732A	27128A	
Am2764	27256	**Seeq**
Am27128	27512	2764
Am27128A	27513	27128
Am27256	2816A	27256
Am27512	2817A	27C256
Am9864	2864	2816A
Fujitsu	**Mitsubishi**	2817A
MBM2732A	M5L2764	5133
MBM2764	M5L27128	5213
MBM27C64	M5L27C128	52B13
MBM27128	**Mostek**	52B33
MBM27256	MK48Z02	5516A
MBM27C256	**Motorola**	55B33
Generic	MCM2716	5517A
2716	MCM2532	**SGS**
27C16	MCM68764	M2716
2732	MCM68766	**TI**
27C32	**National**	SMJ2516
2732A	MM2758-A	TMS2516
2764	MM2758-B	SMJ2532
27C64	MM2716	TMS2532
2764A	NMC27C16	TMS25L32
27128	NMC27C32	TMS2732A
27C128	NMC27C256	SMJ2564
27128A	NMC9817	TMS2564
27256	NMC98C64A	TMS2764
27C256	**NEC**	TMS27128
27512	uPD2716	**Toshiba**
Hitachi	uPD2732	TMM2732
HN462716	uPD2732A	TMM2764
HN462532	uPD2764	TMM27128
HN462732	uPD27C64	TC57256
HN482732A	uPD27128	TMM27256
HN482764	uPD27256	**Xicor**
HN27C64	uPD27C256	X2804A
HN4827128	**OKI**	X2816A
HN27256	MSM2764RS	X2816H
Intel	**Rockwell**	X2864A
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Real Estate
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Applications: Product line analysis; market share and sales territory analysis; distribution planning.

Geographic coverage; Domestic.

Time coverage; 1970 to present.

Online vendor(s): Data Resources, Inc.

EIS Non-Manufacturing Establishments

Producer: Economic Information Systems, Inc. (EIS)
310 Madison Avenue
New York, NY 10017
(212) 697-6080

Data source: Census Bureau statistics, financial reports, journals, books, and directories.

Size: 200,000+ records.

Maintenance: Annual or as needed.

Primary subject: Multidisciplinary.

Secondary subject: Marketing Planning.

Profile: Similar to EIS Industrial Plants (see separate profile listing) except focus is on agriculture, construction, transportation, utilities, finance, and service businesses.

Applications: Market share analysis; market potential studies; line of business identification; company profiles; SIC code comparisons.

Geographic coverage: Domestic.

Time coverage: Most current data.

Online vendor(s): Business Information Services (Control Data) Control Data Corporation-Cybernet DIALOG Information Services, Inc.

Evans Economics Regional Housing Service Data Base

Producer: Evans Economics, Inc.
1211 Connecticut Avenue, N.W.
Suite 710
Washington, D.C. 20036
(202) 342-0050

Data source: Department of Commerce, Bureau of the Census, and Economic Intelligence Associated.

Size: 7,000+ time series.

Maintenance: Continuous.

Primary subject: Multidisciplinary.

Profile: Provides monthly, quarterly and annual time series data on housing statistics at the SMSA, state, regional, and national levels. Data items include the number of housing permits and starts, mobil home shipments and production, non-agricultural employment, personal income, wage and salary disbursements, and average house price.

Applications: Construction/housing industry trend analysis.

Geographic coverage: Domestic.

Time coverage: Varies by series; most from 1970 to present.

Online vendor(s): Business Information Services (Control Data).

Evans Economics USA Database

Producer:
Evans Economics, Inc.
1211 Connecticut Avenue, N.W.
Suite 710
Washington, D.D. 20036
(202) 342-0050

Data source: Bureau of Economic Analysis, The Census Bureau, U.S. Department of Energy, Federal Reserve Board, Federal Trade Commission, Bureau of Labor Statistics,s U.S. Department of Housing and Urban Development, U.S. Department of the Treasury, The Bond Buyer, New York Stock Exchange, and a variety of private trade associations.

Size: 20,000+ time series.

Maintenance: Monthly, quarterly, and annually.

Primary subject: Banking, Economics and Finance.

Secondary subject; Multidisciplinary.

Profile: These time series describe macroeconomic and industry-level economic activity. The macroeconomic data include national income and product accounts, employment, construction, housing starts, exports, imports, balance of payments, production, and wholesale/retail items. The industry data include industrial production indices, shipments, inventories, orders and the annual survey of manufacturers.

Applications: Econometric modeling an forecasting.

Geographic coverage: Domestic

Time coverage: varies by series; most data from 1947 to present

Online vendor(s): Business Information Services (Control Data).

Market Program

Producer: Marshall and Swift Publication Company
1617 Beverly Boulevard
Post Office Box 26307
Los Angeles, California 90026
(213) 624-6415
(800) 421-8042

Data source: Participating mortgage and savings/loan companies in 28 states from the California Market Data Cooperative and the SREA Market Data Center.

Size: 1 million+ records.

Maintenance: Biweekly.

Primary subject: General Management (real estate and building trends).

Profile: Retrieves current sales information on single-family residences in a specific neighborhood. There are over 50 property characteristics for individual sales. A special program is used to analyze individual neighborhoods and to select comparable sales. Multiple regression analysis can also be used in order to determine the property characteristics' effect on sales price and to predict sales price.

Applications: Comparative housing (price and standards) studies; filing complex housing forms assistance.

Geographic coverage: Domestic.

Time coverage: Current 18 months.

Online vendor(s): Marshall and Swift Publication Co.

Merrill Lynch Economics Regional Data Base

Producer: Merrill Lynch Economics, Inc.
One Liberty Plaza
165 Broadway
New York, NY 10080
(212) 766-6200

Data source: U.S. Government and private organization statistics.

Size: 12,000+ time series.

Maintenance: Daily.

Primary Subject: Banking, Economics, and Finance.

Profile: Maintains data on national income, international transactions (federal), plant/equipment expenditures, Federal Reserve Board production indices, survey of manufacturers, consumer/wholesale price indices, retail/wholesale trade, monetary statistics, motor vehicle registration information, and various other national economic and financial data.

Applications: Econometric forecasting.

Geographic coverage: Primarily domestic.

Time coverage: Varies by series, many from 1940's.

Online vendor(s): National CSS, Inc.

Orr System of Construction Cost Management

Producer:
Cost System Engineers, Inc.
131 E. Exchange Avenue, Suite 222
Fort Worth. Texas 76106
(817) 625-1177
(800) 433-2153

Size: 50,000 cost items.

Maintenance: General Management (real estate and building trends).

Profile: Provides a flexible system integrating th user's experience and judgement with the computer's resources to perform cost estimating at all levels of planning and development. Maintains a data base of over 50,000 separate cost construction items. The user can develop an accurate estimate of costs for over 100 metropolitan areas. Preliminary estimates of cost are developed using references from 2,000+ actual projects. Eight levels of cost data are maintained. The most basic level calculates costs based on comparative historical costs at lo9w, medium, or high project specifications. The project is then adjusted for time and location. The final level will produce a detailed quantity survey or buying list.

Applications: Project cost control (man-hour requirements, chart of accounts, value engineering and life cycle costs).

Geographic coverage: Over 100 metropolitan areas.

Time coverage: Current data.

Online vendor(s): Business Information Services (Control Data) General Electric Information Services Co.

PCS/SPEC

Producer: Production Systems for Architects and Engineers, Inc. (PSAE), U. S. Naval Facilities Engineering Command and the U.S. Army Corps of Engineers
1735 New York Avenue, N.W.
Washington, D.C. 20006
(202) 626-7550
(800) 424-5080

Data source: Master land-based construction specifications. These specifications are recognized industry equivalents, the entire master 16 division Construction Specifications Institute (CSI) specifications, and the Saudi-Oriented Guide Specifications (SOGS).

Maintenance: Quarterly

Primary Subject: General Management (real estate and building trends).

Profile: Maintains three file sets which comprise a master construction specification data base for architects and engineers. Used to prepare final specifications from a master data base of specifications.

Applications: Construction specifications reference guide.

Geographic coverage: U.S. and Saudi Arabia.

Time coverage: U.S. and Saudi Arabia.

Online vendor(s): Proprietary Computer Systems, Inc.

Regional

Producer: Chase Econometrics/Interactive Data Corporation
486 Totten Pond Road
Waltham, Massachusetts 02154
(617) 890-1234

Data source: Bureau of Economic Analysis, Bureau of Labor

continued on page 176



3M 5¼" DISKETTES

MDS #	Description	Price
D1001	SS-DD-RH	1.19 ea.
D1004	DS-DD-RH	1.45 ea.
D1010	DS-DD-96TPI	2.35
D1014	IBM PC/AT	3.05

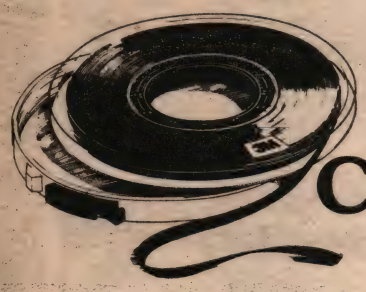
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DC 300XL	18.50
DC 300XL/P	21.25
DC 600A	21.50
DC 1000	13.50
DC 600HC	23.75
DC 615A	16.00
DC 615HC	17.35
DC 2000	17.25

$3.00/5 Cartridges Shipping and Handling



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Black Watch® 700 **Scotch® 777**

"Tape Seal"

Product Description	Price	Product Description	Price
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703-½-3600	20.95		

EL II - Self-threading Cartridge

Product Description	Price	Product Description	Price
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703-½-3600	21.75	Shipping F.O.B. Milford, MI	

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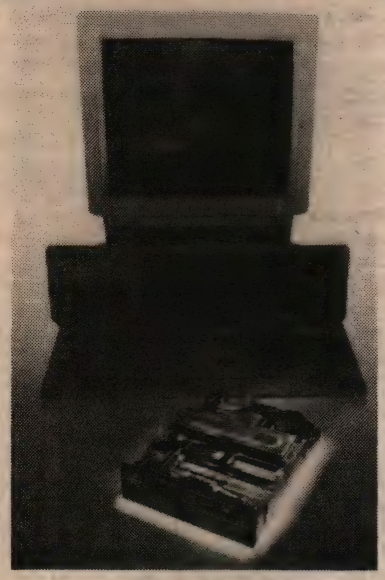
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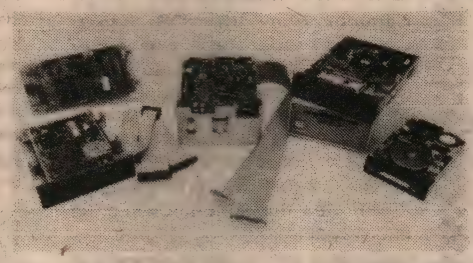
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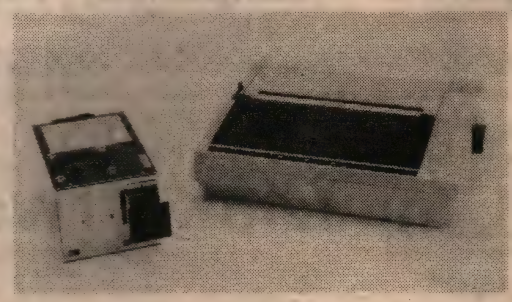
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Real Estate continued from page 174

Statistics, and the U.S. Census Bureau.

Size: 30,000+ time series (per state).

Maintenance: Continuous.

Primary subject: Banking, Economics, and finance.

Secondary subject: Multidisciplinary.

Profile: Provides industry, macroeconomic, and employment coverage for each state and for over 260 SMSA's. The time-series data for the states include personal income, employment, housing, manufacturing, financial data, energy statistics, government revenue, population, cash receipts from crops and livestock, and retail sales. The SMSA macro data include personal income, employment, population, housing retail sales, department store sales and a consumer price index.

Applications: Regional analysis of demographics; sales territory comparisons and potential analysis.

Geographic coverage: Domestic.

Time coverage: Varies by series; most from 1955 to present.

Online vendor(s): Chase econometrics/Interactive Data Corp.

Regional Data Associates (RDA)
Producer: Regional Data Associated (RDA)
194 Nassau Street
Princeton, New Jersey 08540
(609) 924-4611

Data Source: Surveys, RDA estimates, government sources and private organizations.

Size: 20,000 time series.

Maintenance: Continuous.

Primary Subject: Banking, Economics, and Finance.

Secondary subject: Marketing Planning.

Profile: Supplies housing, demographic, financial/economic, and non-residential construction data for all fifty states, the District of Columbia, an over 200 Standard Metropolitan Statistical Areas (SMSAs). Some of the data items include housing starts by type; existing home sales; sales prices of new and existing homes; population by age group; net migration; elementary school enrollment; employment by SIC code; savings deposits; and, construction permits by category 4,000 individual series are forecasted for ten years.

Applications: User may analyze housing starts, prices, age statistics, mortgage activities, or employment, as they relate to his organization and region.

Geographic coverage: Domestic.

Time coverage: 1960 to present plus several forecasts.

Online vendor(s): Chase Econometrics/Interactive Data Corp.

Regional Forecast
Producer: Chase Econometrics/Interactive Data Corporation
486 Totten Pond Road
Waltham, Massachusetts 02154
(617) 890-1234

Data source; Government agencies data with the Chase Econometrics Regional Model.

Size: 6,000+ time series.

Maintenance: Quarterly.

Primary subject: Marketing Planning.

Secondary subject: Banking, Economics, and Finance.

Profile; Provides state and SMSA quarterly and annual forecasts. State forecast data include personal income, retail sales, housing starts, employment, monetary statistics, value added and employment by 2-digit SIC code, energy demand, and population. SMSA forecast data include employment figures, personal income, prices, and population.

Applications: Sales comparison/potential analysis by sales location; forecasting model inputs.

Geographic coverage: Domestic.

Time coverage: 1960 to present with forecasts.

Online vendor(s): Chase Econometrics/Interactive Data Corp.

U.S. Economic/CE
Producer: Chase Econometrics/Interactive Data Corporation
486 Totten Pond Road
Waltham, Massachusetts 02154
(617) 890-1234

Data source: Corporate filings, Federal Reserve Board and various U.S. governmental agencies.

Size: 10,000+ time series.

Maintenance: Continuous.

Primary Subject: Banking, Economics, and Finance.

Profile: Provides industrial-related macroeconomic time series (weekly to annually) data on the U.S. economy. Data items covered include employment, production, national income accounts, prices, construction, inventories, shipments, orders, monetary statistics, and housing.

Applications: Product line forecasting; economic analysis as it relates to pricing and budgeting.

Geographic coverage: Domestic.

Time coverage: Varies by series; most from 1945 to present.

Online vendor(s): Chase Econometrics/Interactive Data Corp.

U.S. Model Data Bank
Producer: Data Resources, Inc.
29 Hartwell Avenue
Lexington, Massachusetts 02173
(617) 861-0165

Data source: Other DRI data bases such as U.S. Central, Platts and U.S. Prices.

Size: 1,100 Quarterly time series.

Maintenance: Quarterly.

Primary Subject: Banking, Economics, and Finance.

Profile: Contains historical data used to support DRI's macroeconomic model of the U.S. economy. This data is actually a subset of some 1,000 key indicators, drawn primarily from other DRI banks. Coverage includes consumer spending, employment and labor, government spending, finance, flow of funds, automobiles, foreign trade, energy, industrial production, business fixed investment, construction and housing, mortgages, inventories, investments, and price and wages.

Applications: Forecasting short and long term economic trends.

Geographic coverage: Domestic.

Time coverage: Varies depending upon series; most are from late 1940's.

Online vendor(s): Data Resources, Inc.

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Source: PC Buyers Guide:Winter 1986 Copyright (Ziff-Davis Publishing Company, New York).

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IBM PC - 64 KB req. - Sample diskettes avail. - Copies sold: 6 since 1982 - Cost: $495.

AMERCOMP, INC.
813-922-1897
*Appraiser's Software
Data entry and printout package for FNMA forms 1004, 1025 and 1073. Produces standard FNMA appraisal forms for residential and condominium properties. Features single keystroke entry for standard words and phrases, and supports editing and integration with data base manager.
IBM PC - 64 KB req. - Copies sold: 4 since 1984 - Cost: $395 per module

ANALYTIC ASSOCIATES
213-541-0418
*planEASe Economic Analysis System
Real estate investment analysis system. Provides financial analysis and cash flow projection for an income-producing property (apartments, offices and shopping centers). There is no limit on the number of leases, expenses, loans or depreciation schedules for a property.
IBM PC, XT, AT - 56 KB req. - Sample diskettes avail. - Introduced: 1982 - Cost: $595

*planEASe Model Modification System
Real estate investment analysis system. Allows the user to modify Analytic Associates' planEASe by changing English language output. Permits reports to be translated to German or French.
IBM PC, XT, AT - 56 KB req. - Copies sold: 50 since 1983 - Cost: $295

*planEASe Partnership Models
Converts the analysis of Analytic Associates' planEASe projections into a limited partnership forecast with reports for potential investors. Permits partnership fees, loans, revenues, expenses and depreciation schedules. Allows the user to specify if partnership fees are to be paid to the general partner or a third party, if the fee is to a percent of gross income or a flat annual amount. IBM PC, XT, AT - 56 KB req. - Sample diskettes avail. - Copies sold: 300 since 1983 - Cost $495.

ANSONN SOFTWARE, INC.
214-446-4340; 214-245-1740
*Real Estate Tools I
Provides time value of money analyses for real estate industry. Produces analyses and amortization schedules for mortgages (regular, balloon, GPM, constant principal and wrap), leases (level and uneven payment), construction loans and grouped and variable cash flows. Provides schedules for uneven payment/interest rate mortgages and mortgages amortized by rule of 78's.
IBM PC, XT - 128 KB req. - Copies sold: 100 since 1983 - Cost: $299.

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213-410-3977
*Property Management
Financial management package for commercial and residential properties. Performs bookkeeping functions with up to 1,000 renters or lessors depending on hardware. Financial records, including income and expense summaries and individual tenant records can be generated.
IBM PC - 48 KB req. - Introduced: 1983 - Cost: $495.

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207-772-8620
*Property Management
Commercial/residential property management system for firms managing office buildings, apartments, shopping centers and malls. Monitors lease expirations and bills tenants for rent and other charges. Ensures that applicable escalation charges are calculated and billed.
IBM PC, XT, AT - 256 KB req. - Copies sold: 10 since 1983

*Subsidized Housing Property Management
Accommodates government subsidized housing. Handles section 8, rental assistance payments, rent supplement, section236, FMHA rental assistance and loan programs and state agency reporting. Produces government voucher payment requests.
IBM PC, AT, XT - 256 KB req. - Sample diskettes avail. - Copies sold: 10 since 1983

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*BREAK
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*Return
Evaluates return on investment. Allows the user to calculate rate of return and provides the present value tables via a single set of entries, with calculations on a monthly , quarterly or annual basis. Includes English question and answer format, user options and documentation.
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818-346-0730

continued on page 178

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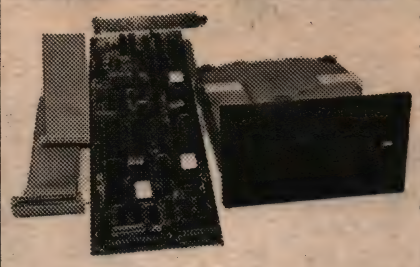
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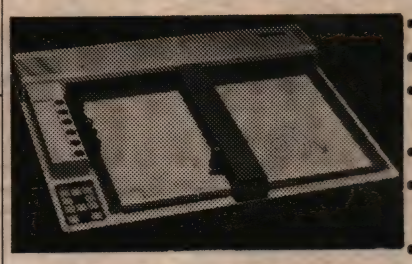
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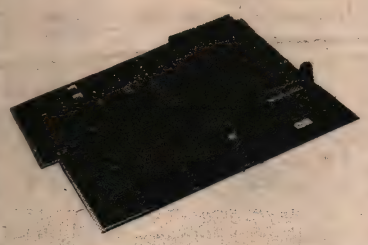
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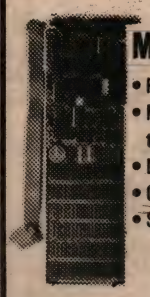
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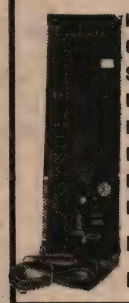
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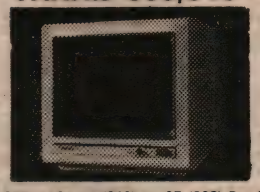
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- Use with Taxan 640

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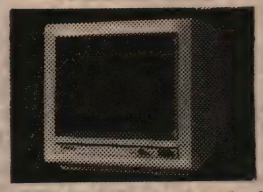
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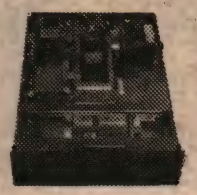
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- Half Height

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$79.00 135 Watt for use with PC/XT
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Taxan TV Tuner (Composite)	79.00
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PC Mouse	CALL
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Real Estate
continued from page 176

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Billing/payment control and date maintenance system for apartments and commercial buildings. Holds information on each unit/apartment/suite, the lease, occupants, billing, and maintenance plus 19 extra user-definable fields. Billing for standard amount, seven recurring or one-time amounts.
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CENTENNIAL SOFTWARE, INC.
303-691-5586
*RealFocus
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Data can be saved on disk.
IBM PC - 48 KB req. - Copies sold: 700 since 1982 - Cost: $125.

CHAMPION SOFTWARE CORP.
303-278-8666; 800-243-2626
*REBOS (Real Estate Brokerage Office System)
Automates management, sales, secretarial and property listing functions. Computerizes tickler file, which tracks progress of each individual listing. Creates a customer data base.
IBM PC, XT - 128 KB req. - Copies sold: 130 since 1984 - Cost $2,500.

CLASSIC SOFTWARE, INC.
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IBM PC, XT, AT - 128 KB req. - Copies sold: 5 since 1980 - Cost: $1,500.
*TELUS System
Tenant directory system that locates a company or an individual within an office complex. Displays appropriate building and suite number after entering company or employee name. Displays a site plan of the complex for locating the building on the property. Accommodates 3,000 names and locations.
IBM PC - Introduced: 1985 - Cost: $8,500
*THOMAS (Tenant Onsite Management System)
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IBM PC, XT - 128 KB req. - Introduced: 1984 - Cost: $750.

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*Comsen Manufactured Housing System
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IBM PC, XT, AT - 256 KB req. - Copies sold: 10 since 1983 - Cost: $1,000 -$10,000.

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212-972-8822
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IBM XT - 256 KB req. - Copies sold: 75 since 1984 - Cost: $2,250.
*Comstar Real Estate Multiple Listing Service System
Listing and bulletin management, Interfaces to member broker's systems to provide updated listings and bulletins. Customizes screens and printouts to match manual forms currently in use by MLS. Interfaces to Comstar's Real Estate Broker Information System.
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CONTRAX SYSTEMS, INC.
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IBM PC, XT - 256 KB req. - Cost: $12,000 - $15,000.

CONWAY DATA, INC.
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*Apartment Complexes
Maintains detailed record of property location, characteristics and contacts. Provides data entry, query and reporting utilities for listings. Integrates with other modules in Geo-Econ Hotlists software or stands alone.
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*Geo-Econ Hot List Software Series
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continued on page 184

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5. monochrome adaptor,
6. monochrome monitor (TTL or composite),
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3. floppy disk controller,
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m. Keyboard for IBM PC (KBO-880) ..... $ 79

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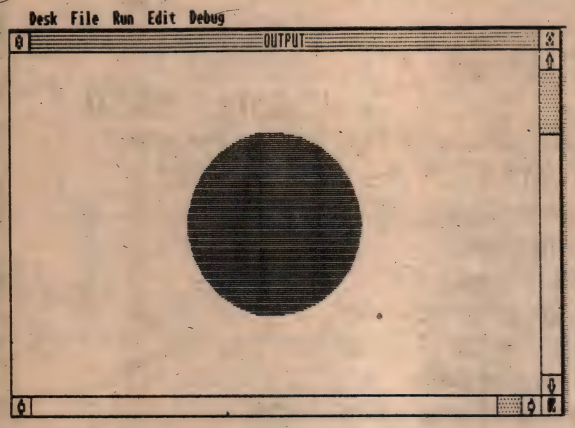
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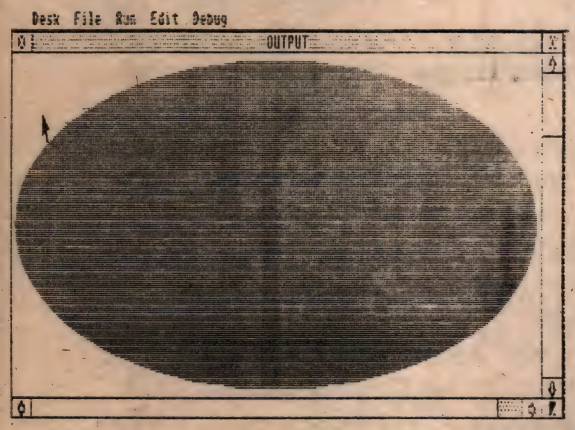
CIRCLE PROGRAM




```
10    ' draw a circle at 304,105 with radius 100
20    color 1,3,2,1,1:fullw 2
30    poke contrl,11
40    poke contrl+2,3
50    poke contrl+6,0
60    poke contrl+10,4
70    poke ptsin,304
80    poke ptsin+2,105
90    poke ptsin+8,100
100   vdisys(1)
```

FIG 1

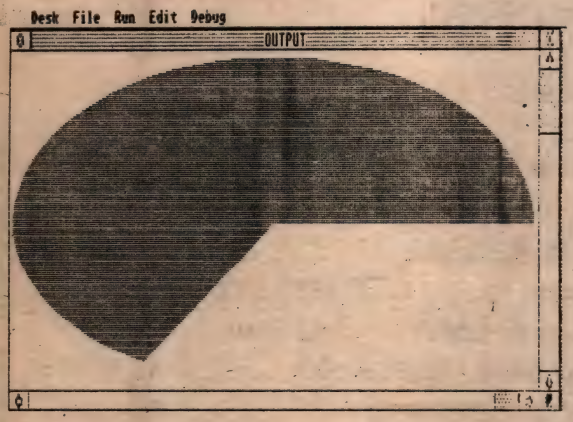
ELLIPSE PROGRAM




```
10    ' draw an ellipse at 304,105  with radius 300,80
20    color 1,3,2,1,1:fullw 2
30    poke contrl,11
40    poke contrl+2,2
50    poke contrl+6,0
60    poke contrl+10,5
70    poke ptsin,304
80    poke ptsin+2,105
90    poke ptsin+4,300
100   poke ptsin+6,80
110   vdisys(1)
120   goto 120
```

FIG 2

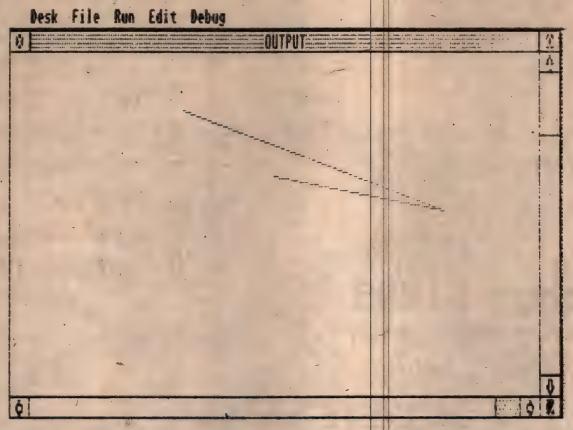
ELLIPTICAL PIE PROGRAM




```
10    ' draw an elliptical pie centered at 304,105
15    clearw 2
20    color 1,3,2,1,1:fullw 2
30    poke contrl,11
40    poke contrl+2,2
50    poke contrl+6,2
60    poke contrl+10,7
70    poke ptsin,304
80    poke ptsin+2,105
90    poke ptsin+4,300
100   poke ptsin+6,80
102   poke intin, 0
104   poke intin+2,2400
110   vdisys(1)
120   goto 120
```

FIG 3

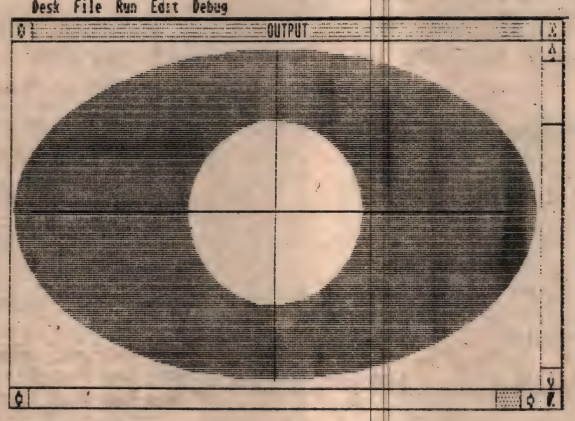
POLLYLINE PROGRAM




```
10    ' draw a couple of lines using polyline method
20    color 1,3,2,1,1:fullw 2
30    poke contrl,6
40    poke contrl+2,3
50    poke contrl+6,0
60    poke ptsin,304
70    poke ptsin+2,83
80    poke ptsin+4,500
90    poke ptsin+6,100
100   poke ptsin+8,200
110   poke ptsin+10,50
120   vdisys(1)
```

FIG 4

COLOR ELLIPSE PROGRAM




```
20    clearw 2
30    ' draw an ellipse at 304,105  with radius 300,80
40    color 1,2,2,1,1:fullw 2
50    poke contrl,11
60    poke contrl+2,2
70    poke contrl+6,0
80    poke contrl+10,5
90    poke ptsin,304
100   poke ptsin+2,105
110   poke ptsin+4,300
120   poke ptsin+6,80
130   vdisys(1)
140   ' draw a circle at 304,105 with radius 100
150   color 1,1,2,1,1:fullw 2
160   poke contrl,11
170   poke contrl+2,3
180   poke contrl+6,0
190   poke ptsin+8,304
200   poke contrl+10,4
210   poke ptsin,304
220   poke ptsin+2,105
230   poke ptsin+8,100
240   vdisys(1)
250   ' draw X-Y axes using polyline method
260   color 1,1,1,1,1:fullw 2
270   poke contrl,6
280   poke contrl+2,5
290   poke contrl+6,0
300   poke ptsin, 25
310   poke ptsin+2,105
320   poke ptsin+4,575
330   poke ptsin+6,105
340   poke ptsin+8,304
350   poke ptsin+10,105
360   poke ptsin+12,304
370   poke ptsin+14,25
380   poke ptsin+16,304
390   poke ptsin+18,185
400   vdisys(1)
410   goto 410
```

FIG 5

BAR GENERATION PROGRAM




```
10    ' draw a bar from 5,25  across to 150,40
20    color 1,2,2,1,1:fullw 2
30    poke contrl,11
40    poke contrl+2,2
50    poke contrl+6,0
60    poke contrl+10,1
70    poke ptsin,5
80    poke ptsin+2,25
90    poke ptsin+4,150
100   poke ptsin+6,40
110   vdisys(1)
120   ' draw a bar from 50,100 up to 50,50
130   poke contrl,11
140   poke contrl+2,2
150   poke contrl+6,0
160   poke contrl+10,1
170   poke ptsin,50
180   poke ptsin+2,100
190   poke ptsin+4,70
200   poke ptsin+6,50
210   vdisys(1)
220   goto 220
```

FIG 6

MOUSE POSITION PROGRAM

	BAR	ARC	CIRCLE	ELLIPSE	RECTANGLE
Contrl	11	11	11	11	11
Contrl+2	1	4	3	2	2
Contrl+6	0	2	0	0 (2)*	0
Contrl+10	1	2 (3)*	4	5 (6) (7)*	8 (9)*
Ptsin	X(1)	X(center)	X(center)	X(center)	X(1)
Ptsin+2	Y(1)	Y(center)	Y(center)	Y(center)	Y(1)
Ptsin+4	X(2)	0	0	X-radius	X(2)
Ptsin+6	Y(2)	0	0	Y-radius	Y(2)
Ptsin+8	----	0	radius	----	----
Ptsin+10	----	0	0	----	----
Intin	----	start <	----	start < *2	----
Intin+2	----	end <	----	end <	----

```
10    ' print mouse x,y position
12    clearw 2
20    a#=gb
30    control=peek(a#)
40    global=peek(a#+4)
50    gintin=peek(A#+8)
60    gintout=peek(a#+12)
70    addrin=peek(a#+16)
80    addrout=peek(a#+20)
85    AGAIN:
90    gemsys(79)
100   ax = peek(gintout+2)
102   ay = peek(gintout+4)
105   ' print ax
110   ' print ay
140   if peek(gintout+6)<>0 then linef ax,ay-22,ax,ay-22
200   goto AGAIN
```

FIG 7

PORTRAIT OF AUTHOR AS BEGINNING GRAPHICS PROGRAMMER

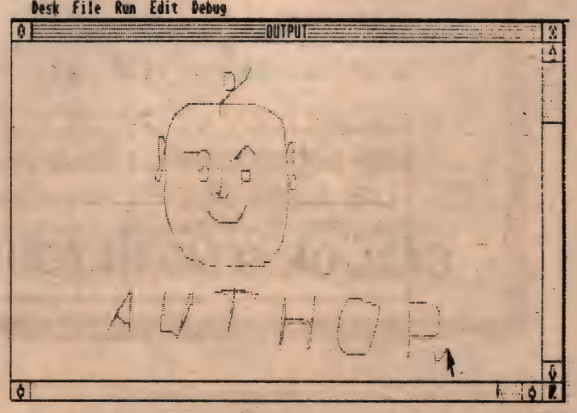


FIG 8



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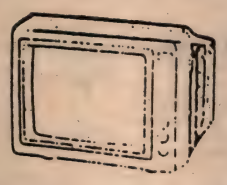
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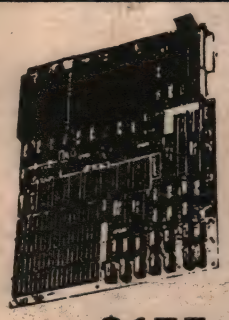
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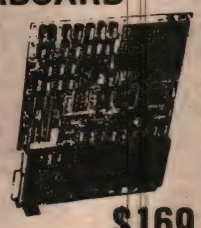
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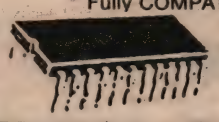
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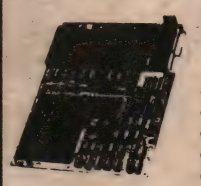
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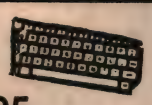


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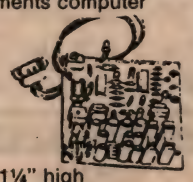
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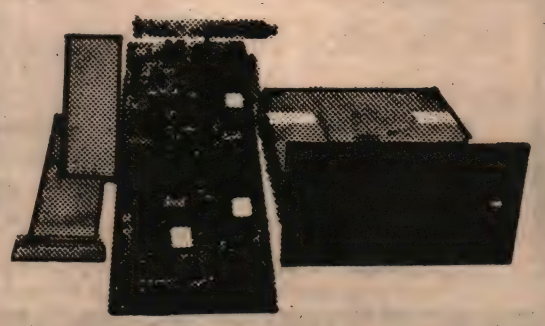
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Real Estate
continued from page 178

Geo-Econ Hotlists software of stands alone.
IBM PC, ST, AT - 256 KB req. - Cost: $299
* Retail Property
Maintains detailed record of property location, characteristics and contacts. Provides data entry, query and reporting utilities for listings. Integrates with other modules in Geo-Econ Hotlists software or stands alone.
IBM PC, XT, AT - 256 KB req. - Cost: $299
*Unimproved Land
Maintains detailed record of property location, characteristics and contacts. Provides data entry, query and reporting utilities for listings. Integrates with other modules in Geo-Econ Hotlists software of stands alone.
IBM PC, XT, AT - 256 KB req. - Cost: $299
*Warehouse Facilities
Maintains detailed record of property location. characteristics and contacts. Provides data entry, query and reporting utilities for listings. Integrates with other modules in Geo-Econ Hotlists software or stands alone.
IBM PC, XT, AT - 256 KB req. - Cost: $299

CREATIVE MANAGEMENT SYSTEMS, INC. (NJ)
201-341-6165
*PMS Property Management System
Handles financial complexities of managing a community association. Includes AR and Billing, AP and Check Writing, Payroll, and GL and Financial Accounting. Modules can be purchased separately.
IBM PC, AT - 48 KB req.

CTS SERVICES, INC.
214-637-3344
*RESOLVE Property Management System
Tracks leases, tenants and properties. Accommodates commercial property, retail billing property, apartments, condominiums, townhouses; and residential homes and duplexes. Provides cash applications, selective invoicing, and monthly statements with customized accounting features.
IBM PC, XT - Introduced: 1983

DATA REALTY, INC.
201-531-7770
*DataBroker
Integrated office management system for real estate brokers. Includes general ledger, accounts payable, sales management/analysis and escrow management. Available options are integrated word processing, accounts receivable, payroll and a custom report generator.
IBM Pc, XT, AT - 192 KB req. - Copies sold: 85 since 1983

DECISIONEX, INC.
203-226-7424
*TENcost
performs cost of occupancy analysis. Provides a projection of cost of occupancy of a single lease from the corporate tenant point of view. Takes into account the actual or proposed lease provisions and compares alternate lease proposals on a present value of level rent annuity basis.
IBM PC - 192 KB req. - Introduced: 1984 - Cost: $495

DISTRIBUTED COMPUTING SYSTEMS
312-495-0121
*Residential Property Analysis
Real estate financial modeling package. Provides residential modeling for up to ten years for homeowners, buyers or agents. Projects property value, equity position and mortgage balances with net cost of ownership.
IBM PC - 64 KB req. - Introduced: 1982 - Cost: $30.

DOMINION FINANCIAL PROJECTION
804-855-2398
*Real Estate Investment Analysis
Analysis package for real estate syndications/investments. Analyzes cash flow, tax shelter and total ROI for real estate syndications. Latest tax laws are incorporated so that depreciation recapture and amortization of front end costs (construction interest, legal, partnership, and organizations) are applied for residential, commercial or low income residential property.
IBM PC - 128 KB req. - Sample diskettes avail. - Copies sold: 25 since 1982 - Cost: $585.

DSF ASSOCIATES
503-244-4800
*Moneybags
Property evaluation template for Lotus 1-2-3 or Context MBA. Evaluates the financial benefits in purchasing rental property. Provides and eight-year projection on profitability of rental property.
IBM PC - 256 KB req. - Copies sold :128 since 1983 - Cost $50.
*REALSPREAD
Property management spreadsheet template designed to work with Lotus 1-2-3 or Context MBA. Provides budget and actual results for a rental complex. Allows management to track expenditures and income.
IBM PC - 256 KB req. - Copies sold: 497 since 1983 - Cost: $50.

DYNAMIC COMPUTER SYSTEMS
306-569-2434
*Property Management
IBM PC - 128 KB req. - Sample diskettes avail. - Copies sold: 1 since 1984 - Cost: $1,000

ELECTRONIC COURSEWARE SYSTEMS, INC.
217-359-7099
*Comparative Market Analysis
Determines the comparative market value of any home. Defines thirteen individual home features such as location, type of structure, square footage, lot size, number of baths, and type of financing available. Once the features of the subject property and comparable properties have been identified, the program will generate and display a detailed analysis and the computed market value of the subject property.
IBM PC - 128 KB req. - Introduced: 1984 - Cost: $125.
* Duty Roster
Assists real estate administrative personnel with the scheduling of agents for telephone or other duties. Generates a twenty-one day duty roster specific to the user's needs. Scheduling variables include five daily time periods and the number of personnel to be assigned per time period.
IBM PC - 128 KB req. - Introduced: 1984 - Cost: $125

EXECUWARE, INC.
919-760-3576
*REAP (Real Estate Analysis)
Performs property income analysis and tax calculations. Calculates after tax results if sold or exchanged, highlights tax sheltering effects, simulates inflation and provides insight needed to make decisions on whether to buy, hold or dispose of property. Allows up to 20 year projections and utilizes the Rule of 78's, ACRS depreciation methods and multiple and/or assumable loans.
IBM PC - 48 KB req. - Sample diskettes avail. - Copies sold: 1,150 since 1982 - Cost $150.

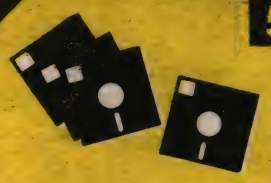
FISHER BUSINESS SYSTEMS
404-587-1717
* Property Management System
Keeps a separate GL for cash property. Tenant processing applications include AR and lease management.
IBM PC, XT - 128 KB req. - Sample

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Real Estate
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diskettes avail. - Copies sold: 75 since 1979 - Cost: 2,800.

FOX SYSTEMS, INC.
612-941-0650
* Fox Real Estate System
Turnkey real estate marketing, management, accounting and sales analysis system.
IBM PC, XT, AT - 256 KB req. - Sample diskettes avail. - Copies sold: 300 since 1979 - Cost $4,000;lease plans available.

FRANKLEN COMPUTER SYSTEM, INC.
818-247-0400
*PMS-11 (property Management System)
Residential and commercial property management, billing and aging package. Produces tenant billing and AR age analysis. Maintains property and tenant master files to control lease expirations, scheduled rent increases and insurance expiration.
IBM PC - 128 KB req. - Sample diskettes avail. - Copies sold: 15 since 1982 - cost: $2,500 (IBM PC, MSDOS); $4,000 (DEC)

G.B. SYSTEMS
714-953-1511
*The Apartment Manager
Large apartment complex management turnkey system. Provides printout of all cash transactions. Permits transaction totals to be posted to the general ledger.
IBM PC, XT, AT - 256 KB req. - Copies sold: 23 since 1983 - Cost: $20,175 (for 8 users)

GEM DATA PROCESSING CO.
302-846-9553
*Property Rental Reservation System
Provides on-line availability of rental properties by selected category, Includes owner accounting, cleaning schedule, deposit recording, check-ins, and management reporting for short term rentals. Includes owner accounting and reservations. Owner accounting provides tracking of revenues and expenses of reach unit, with settlement at month's end.
IBM PC - 128 KB req. - Copies sold: 6 since 1979

GOODE/STEELY ASSOCIATES
503-942-7361
*Alpha-Real-Estate
Turnkey system. MLS package for small to medium boards with on-line capabilities an office/sales management functions. Produces MLS books, updates and sold books. Provides on-line MLS access from real estate offices offering property and client searches.
IBM PC, XT, AT - 60 KB req. - Copies sold: 4 since 1980 - Cost: $5,000.

GSI, INC.
713-360-3561
*Real Estate Guide
Real estate analysis of the commercial broker or individual investor using ten year projections for expenses, income, depreciation, tax write-offs; ACRS and straight line depreciation; 30 year amortization schedule; raw land syndication. Includes a personal financial statement.
IBM PC - 256 KB req. - Copies sold: 300 since 1983 - Cost: $160.

HELU CORP.
808-263-6323
*HELU/PM - Commercial
Handles commercial properties such as office buildings and shopping centers. Maintains unit, tenant, owner and vendor files. Allocates income and expense for each unit.
IBM PC, XT, AT - 128 KB req. - Copies sold: 10 since 1982 -Cost: $798
*HELU/PM -Residential
Handles residential properties such as apartments, condominiums and single family dwellings. Maintains unit, tenant, owner and vendor files. Allocates income and expense to each unit.
IBM PC, XT, AT - 128 KB req. - Copies sold: 10 since 1984 - Cost: $798

IBM (INTERNATIONAL BUSINESS MACHINES)
914-765-1900
*Member Services
Maintains accounts for rental, condominium or association units. Prints reports and directories in alphabetical sequence, by account number or by unit number. Makes inquiries by entering part of a last name, and account number or the unit number.
IBM PC, XT, AT, Portable PC - 192 KB req. - Cost: $30.

INFORMATICS GENERAL CORP.
305-327-3020
*MCS Investment Modeling
Investment modeling services for property managers. Calculates rations and projections. Offers depreciation, amortization, internal rate of return, breakeven ratios and Ellwood analysis.
IBM PC, XT - 64 KB req. - Copies sold: 49 - Cost: $800-$1,000.

IPC SERVICES, INC.
312-699-0077
*Income Property Management
Accounting system with interactive AR, AP and GL. Provides help prompts, automatic field editing, tenant, vendor and account inquiry, standard or user-defined chart of accounts, automatic monthly billings, pass through charges, duplicate invoice control and one step closing for GL.
IBM XT, AT - 128 KB req. - Copies sold: 60 since 1984 - Cost: $1,995

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7. 640K Mother board $900
8. Multi Function, 0K $215

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3. Monographic Card $125
(720 x 348 w/ printer port)
4. Printer Card $27
5. Teac 55B 360K $85
6. Metal Case $49
7. 135w Power Supply $89
w/ DC Fan, 110v/220v switchable
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with cable
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Real Estate
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*LeaseTrac - Lease Management System
Notifies user in advance of expirations, rental adjustments, options, and other tracking dates on real property leases. Tracks dates related to a real property lease agreement. Notifies the user every month of leases expiring within the next six months, leases with rental adjustments this month or next month, lease currently within an option exercise window, leases with a special tracking date this month or next month and leases on a month-to- month status.
IBM PC, XT, AT - 128 KB req. - Copies sold: 23 since 1984 - Cost $595.

NORMAN JACOBSON REALTY RESOURCES, INC.
213-203-0995
*Appraisal Master for Income Property
Revises price, terms, loan payments, property taxes, ratios, cost-per-unit and square feet with changes in income expenses, and financing variables. Also computes cleaning, decorating, repairs, replacements, and payoff taxes.
IBM PC - 64 KB req. - Sample diskettes avail. - Copies sold: 190 since 1984 - Cost: $495

JACORE SYSTEMS OF SOUTH CAROLINA, INC.
404-952-9400; 800-982-2500 (GA)
*Property Management
Property management tenant AR system. Tracks monthly tenant payment activity by project. The number of projects and the number of tenants per project is limited only by the disk space.
IBM PC - 256 KB req. - Sample diskettes avail. - Copies sold: 3 since 1984 - Cost: $995

JERSEY MICRO SYSTEMS, INC.
609-665-7611
*CREAM (Complete Real Estate Agency Management)
Real estate brokerage sales management system. Provides company dollar accounting, chart of accounts based on NAR's standards, activity, profitability and income reports, active listing, sales pending, business sources, referral, expiration warning, sales rank, financing and management compensation reports, staff reports and mortgage amortization.
IBM PC - Copies sold: 12 since 1980 - Cost: $995

LIBRA PROGRAMMING, INC.
801-943-2084; 800-453-3827
*Property Management
Keeps track of tenant payments and property expenses suited to apartments, condominiums, office buildings, shopping centers, mobile home parks and mini-warehouses. Retains history of payments, bad checks and numbers of months late for each tenant. Compares actual to potential rental income for each unit and charges late fees on a case-by-case basis.
IBM PC, XT, AT - 192 KB req. - Copies sold: 150 since 1981 - Cost: $1,400-$3,200.

MAGIC MICRO SYSTEMS, INC.
305-246-2222
*Management Matrix System
Condominium management system. Provides AR, AP and GL. Produces 30-60-90 day aging report statements, coupons and mailing levels, Includes budgeting and cash flow requirements ;by percentage capabilities. Generates financial reports.
IBM PC - 128 KB req. - Copies sold: 12 since 1982 - Cost: $1,995-$3,995

MANAGEMENT REPORTS, INC.
216-464-3225; 800-321-8770
*BIG SYS
Residential management. Partial payment, security applications, and miscellaneous income. On-site or centralized collection management environment. High-level audit controls.
IBM PC - 256 KB req. - Copies sold: 1 since 1985 - Cost: $2,500.
*PC Commercial Property Management
Open item receivables integrates to a tenant/lease abstract data base, percent of rent calculations and sales reporting and expense recoveries and escalations. Lease terms vary. Report writer allows user-defined tenant reporting and analysis
IBM PC - 256 KB req. - Copies sold: 140 since 1979 - Cost: $4,250
*R/E Think
Real estate analysis. Variable or fixed rates, balloons, participations, and refinancing, with any multiple combinations. Lease data on rents, %rent calculations, escalations and recoveries can be changed to reflect variations by tenants. Charges can be calculated on a different basis for each tenant, by period by tenant. Global growth rates, market rates, and vacancies. Lease reporting, rollover reports, and assumption reports.
IBM PC - 256 KB req. - Copies sold: 15 since 1985 - Cost: $1,995.

MANTEKS CO.
Data Processing Division
312-439-0018
* Mr. Land Lord
Property management system. Keeps records of commercial or residential tenant's accounts. Reports generated include rentroll (room number, security deposits, charges, payments and ending balance), delinquency report, 30, 60, 90 day, lease expiration, tenant ledger card (history of individual's payments), tenant birthday report and alpha report.
IBM PC, XT - 128 KB - Sample diskettes avail. - Copies sold: 9 since 1983 - Cost: $1,500.

MATCHMAKER ENTERPRISES
213-370-7143
*Real Estate Genius
Bulletin board program for realtors providing 24 hours a day service. Creates up to 100 files for inventory an information. Includes an editor, public domain communications and back-up-programs.
IBM PC - 64 KB req. - Copies sold: 8 since 1984 - Cost: $149.

MICRO-VECTOR, INC.
914-273-8700
*Property Management
Automated portfolio of leases and property listings, owned or occupied. Provides centralized control over leased properties by tracking base rents, escalations, options, sub-lease tenants and internal chargebacks, site profiles and critical action dates.
IBM PC, XT, AT

MICROSYS, INC.
505-262-2388
Financial Industries Division
*Escrow Contract Accounting
Maintains record for real estate contracts held in escrow, Supports multiple disbursements for payments. Handles escrow fees and late charges.
IBM PC, XT, AT - 56-128 KB req. - Sample diskettes avail. - Cost: $5,000.

MICROVENTURE
714-660-0122
*SOLD Client Prospecting
Real estate agent organization an planning tool. Prepares mailing lists and labels for customized letters. Generates special reports using tickler dates.
IBM PC - 256 KB req. - Sample diskettes avail. - Copies sold: 200 since 1984 - Cost $649
*SOLD Real Estate Accounting
General ledger system for property management. Produces reports and audit trails. Detail profit centers, historical, budgets and large capacities.
IBM PC, XT, AT - 256 KB req. - Sample diskettes avail. - Copies sold: 200 since 1982 - Cost $649.
*SOLD Real Estate Work Processing
Creates and checks spelling of real estate oriented letters and documents.
IBM PC, ST - 256 KB req. - Sample diskettes avail. - Copies sold: 200 since 1982 - Cost: $395.
*SOLD Residential Financial Analysis
Analyzes property, closing costs to buyer and seller, amortization. Analyzes 10 years of future real estate purchases for sales agents of investors. Generates reports on amortization schedules, equity analysis, real cost of ownership, closing costs for buyers and sellers, earnings and cash flow and investment.
IBM PC, XT - 256 KB req. - Sample diskettes avail - Copies sold: 200 since 1982 - Cost: $395.
*SOLD Residential Property Management System
Handles single- and multiple-unit properties. Supports trust accounting. Posts data to all journals and property records.
IBM PC, XT - 256 KB req. - Sample diskettes avail. - Copies sold: 200 since 1982 - Cost: $749.
*SOLD Sales Management
Real estate management system. Manages listings, transactions and agent performance. Tracks properties from listing to settlement.
IBM PC, XT - 256 KB req. - Sample diskettes avail. - Copies sold: 200 since 1982 - Cost: $649.

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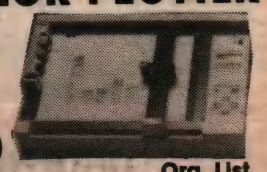
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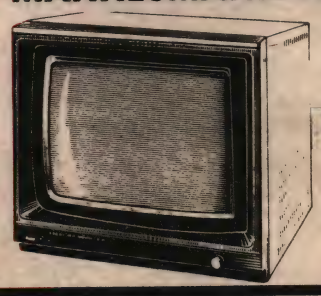
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Applying The Atari continued from page 162

Improved Directory Program

```
1 REM DIRECTORY PROGRAM MOD. BY N. WORTH
2 DIM FILE$(17),R$(1)
3 OPEN #1,6,0,"D:*.*"
4 INPUT #1,FILE$
5 PRINT FILE$;CHR$(32);CHR$(32);
6 IF FILE$(5,8)="FREE" THEN 8
7 GOTO 4
8 CLOSE #1
9 ? :? :? "RUN AGAIN (Y/N)";:INPUT R$
10 IF R$="Y" THEN ? :? "INSERT DISK AND PRESS RETURN";:INPUT
#16;R$
11 IF R$="N" THEN ? CHR$(125):NEW
12 GOTO 3
```

PROGRAM 1

STRING/SCREEN SWAP ROUTINE

```
10  *=$600 ; RELOCATABLE
20 ; STRING/SCREEN SWAP
30 ; SWAPS 7680 BYTES OF STRING W/GR.8 SCREEN
40 ; FORM: A=USR(ADR(SWAP$),ADR(A$))
50 ; WHERE SWAP$ IS THIS ROUTINE      36 ; AND A$ IS STRING TO SWAP
60  PLA
70  PLA
80  STA $CD  ; SAVE STRING ADR
90  PLA
0100  STA $CC
0110  LDA 88
0120  STA $CE ; SAVE SCREEN ADR
0130  LDA 89
0140  STA $CF
0150  LDX #192 ; 192 LINES
0160 LOOP2 LDY #39 ; 40 BYTES/LINE
0170 LOOP LDA ($CC),Y ; GET BYTE OF STRING
0180  PHA           ; SAVE IT
0190  LDA ($CE),Y   ; GET BYTE OF SCREEN DATA
0200  STA ($CC),Y   ; STORE IN STRING
0210  PLA           ; RETRIEVE STRING BYTE
0220  STA ($CE),Y   ; STORE IN SCREEN MEM
0230  DEY
0240  BPL LOOP
0250  CLC
0260  LDA $CC
0270  ADC #40  ; NEXT STRING "LINE"
0280  STA $CC
0290  LDA $CD
0300  ADC #0
0310  STA $CD
0320  CLC
0330  LDA $CE
0340  ADC #40  ; NEXT SCREEN LINE
0350  STA $CE
0360  LDA $CF
0370  ADC #0
0380  STA $CF
0390  DEX
0400  BNE LOOP2
0410  RTS
0420  .END
```

PROGRAM 5

PUT SCREEN PIECE ROUTINE

```
10  *=$600  ; RELOCATABLE
20 ; PUT BLOCK ROUTINE
30 ; (c)1986 JEFF BRENNER
40 ; TRANSFER STRING TO SECTION OF GR.8 SCREEN
50 ; (8 BYTE BY 32 LINE SECTION)
60 ; FORM A=USR(PUT,ADR(P$),SCREEN)
70 ; DIM P$(320), P$ STORES DATA
80 ; SCREEN=SCREEN LOC. TO START PUT
90  PLA
0100  PLA
0110  STA $CD  ; SAVE STRING ADR
0120  PLA
0130  STA $CC
0140  PLA
0150  STA $CF  ; SAVE SCREEN ADR
0160  PLA
0170  STA $CE
0180  LDX #32  ; VERTICAL BYTES (LINES) FOR PIECE
0190 AGAIN LDY #7  ; * HORIZONTAL BYTES FOR PIECE-1
0200 LOOP1 LDA ($CC),Y
0210  STA ($CE),Y
0220  DEY
0230  BPL LOOP1
0240  CLC
0250  LDA $CE
0260  ADC #40   ; NEXT SCREEN LINE
0270  STA $CE
0280  LDA $CF
0290  ADC #0
0300  STA $CF
0310  LDA $CC
0320  ADC #8    ; * HORIZONTAL BYTES FOR PIECE
0330  STA $CC
0340  LDA $CD
0350  ADC #0
0360  STA $CD
0370  DEX
0380  BNE AGAIN
0390  RTS
0400  .END
```

PROGRAM 4

decoding routine is loaded into the Atari's international character set memory at $CC00 to $CCD3. The Atari's actual vertical blank interrupt routine is then rerouted to execute the keypad routine. This is the beauty of having a RAM OS — we can add extensions to the *actual* Atari OS without having to worry about vectors that might be utilized or changed by the next program loaded in. None of the application RAM is used, and thus the keypad driver is transparent to most programs.

The next step is to display the introductory message on the screen and wait for the SELECT key to be pressed. When it's pressed, a jump is made to the Atari's cold start vector (COLDSV, $E477) so that the next diskette can be booted. Necessary portions of the OS are changed before jumping to COLDSV to prevent the ROM OS from being reenabled and to prevent the COLDSV routine from clearing the RAM OS when the rest of the memory is zeroed.

Next Month

We'll take a look at the assembly listing for the kaypad routine, plus we'll enter a personal budget program, designed in response to readers' requests.

Readers' questions, comments and contributions are welcome. Please enclose a self-addressed, stamped envelope (SASE) for a personal reply.

A diskette of the programs listed in this month's column is available from the author for $7.00, postpaid. Please make checks payable to "Jeff Brenner" and specify your disk drive model.

"Program Perfect" is a utility used to check for typing errors while entering programs from this column. Readers may send $5.00 for a diskette or a SASE for a listing of this program. Address all correspondence to:

Jeff Brenner
"Applying The Atari 4/86"
c/o *Computer Shopper*
PO Box F
Titusville, FL 32781-9990 ●

GET SCREEN PIECE ROUTINE

```
10  *=$600 ; RELOCATABLE
20 ; GET BLOCK ROUTINE
30 ; (c)1986 JEFF BRENNER
40 ; TRANSFER SECTION OF GR.8 SCREEN TO STRING
50 ; (FOR 8 BYTE BY 32 LINE SECTION)
60 ; FORM A=USR(GET,ADR(P$),SCREEN)
70 ; DIM P$(320), P$ STORES DATA
80 ; SCREEN=SCREEN LOC. TO START GET
90  PLA
0100  PLA
0110  STA $CD  ; SAVE STRING ADR
0120  PLA
0130  STA $CC
0140  PLA
0150  STA $CF  ; SAVE SCREEN ADR
0160  PLA
0170  STA $CE
0180  LDX #32  ; VERTICAL BYTES (LINES) FOR PIECE
0190 AGAIN LDY #7  ; * HORIZ BYTES FOR PIECE-1
0200 LOOP1 LDA ($CE),Y ; GET BYTE FROM SCREEN
0210  STA ($CC),Y ; STORE IN STRING
0220  LDA #0
0230  STA ($CE),Y ; ERASE BYTE OF SCREEN
0240  DEY
0250  BPL LOOP1
0260  CLC
0270  LDA $CE
0280  ADC #40     ; NEXT SCREEN LINE
0290  STA $CE
0300  LDA $CF
0310  ADC #0
0320  STA $CF
0330  LDA $CC
0340  ADC #8      ; * HORIZ BYTES PER PIECE
0350  STA $CC
0360  LDA $CD
0370  ADC #0
0380  STA $CD
0390  DEX
0400  BNE AGAIN
0410  RTS
0420  .END
```

PROGRAM 3

CX-85 DRIVER CREATOR

```
HTJ 10 REM CX-85 NUMERIC KEYPAD DRIVER CREATOR
KGJ 20 REM COPYRIGHT 1986 JEFF BRENNER
TPJ 30 PRINT CHR$(125);"INSERT FORMATTED DISKETTE INTO DRIVE"
PNJ 40 PRINT :PRINT "PRESS <START> TO WRITE AUTORUN FILE."
LQJ 50 IF PEEK(53279)<>6 THEN 50
FAJ 60 PRINT "CREATING AUTORUN.SYS...":OPEN #3,8,0,"D:AUTORUN.SYS"
TFJ 70 FOR I=1 TO 402:READ N:PUT #3,N:NEXT I
YOJ 80 CLOSE #3
MUJ 90 PRINT "COMPLETED.":END
QAJ 100 DATA 255,255,0,6,167,6,120,169,0,141,14,212
RKJ 110 DATA 174,1,211,160,0,185,0,192,206,1,211,153
TOJ 120 DATA 0,192,142,1,211,200,208,241,238,13,6,238
UHJ 130 DATA 19,6,173,13,6,240,14,201,208,208,226,169
RUJ 140 DATA 216,141,13,6,141,19,6,208,216,206,1,211
SFJ 150 DATA 88,96,169,0,141,14,212,162,5,141,10,212
DRJ 160 DATA 202,208,253,169,76,141,138,194,169,0,141,139
JTJ 170 DATA 194,169,204,141,140,194,169,146,141,133,196,169
YTJ 180 DATA 6,141,134,196,160,9,185,85,204,153,220,194
EDJ 190 DATA 136,16,247,160,26,185,94,204,153,169,196,136
BHJ 200 DATA 16,247,169,64,141,14,212,160,79,185,132,204
UUJ 210 DATA 56,233,32,9,128,145,88,136,16,243,173,31
WGJ 220 DATA 208,41,2,208,249,76,119,228,173,1,211,141
DJJ 230 DATA 255,207,32,218,196,169,254,141,1,211,173,255
ICJ 240 DATA 207,141,1,211,96,0,226,2,227,2,0,6
NZJ 250 DATA 224,2,225,2,56,6,0,204,211,204,174,17
VUJ 260 DATA 208,240,6,202,142,82,204,240,47,174,121,2
WVJ 270 DATA 236,84,204,208,5,173,82,204,208,34,173,83
XYJ 280 DATA 204,240,5,206,83,204,240,24,238,82,204,142
RYJ 290 DATA 84,204,238,83,204,173,3,210,201,1,240,2
AXJ 300 DATA 162,16,189,64,204,141,252,2,104,168,104,170
MTJ 310 DATA 104,64,52,24,29,27,35,51,53,48,43,31
IDJ 320 DATA 30,26,50,34,12,14,28,155,0,0,0,169
QHJ 330 DATA 4,133,1,169,0,76,121,204,169,160,133,6
TQJ 340 DATA 173,0,160,73,255,141,0,160,205,0,160,208
SZJ 350 DATA 9,73,255,141,0,160,169,192,133,6,96,160
MZJ 360 DATA 0,153,0,6,200,208,250,76,3,195,67,88
MNJ 370 DATA 45,56,53,32,75,69,89,80,65,68,32,68
LYJ 380 DATA 82,73,86,69,82,32,45,32,40,67,41,49
MQJ 390 DATA 57,56,54,32,74,46,32,66,82,69,78,78
MPJ 400 DATA 69,82,73,78,83,69,82,84,32,80,82,79
MNJ 410 DATA 71,82,65,77,32,68,73,83,75,69,84,84
MFJ 420 DATA 69,32,65,78,68,32,80,82,69,83,83,32
DUZ 430 DATA 83,69,76,69,67,84
```

PROGRAM 7

STRING TO SCREEN ROUTINE

```
10  *=$600 ; RELOCATABLE
20 ; STRING TO GR.8 SCREEN
30 ; (C)1986 JEFF BRENNER
40 ; FORM: A=USR(ADR(STS$),ADR(A$))
50  PLA
60  PLA
70  STA $CD  ; SAVE STRING ADR
80  PLA
90  STA $CC
0100  LDA 88
0110  STA $CE ; SAVE SCREEN ADR
0120  LDA 89
0130  STA $CF
0140  LDX #192  ; 192 LINES
0150 LOOP2 LDY #39 ; 40 BYTES/LINE
0160 LOOP LDA ($CC),Y
0170  STA ($CE),Y
0180  DEY
0190  BPL LOOP
0200  CLC
0210  LDA $CC
0220  ADC #40
0230  STA $CC
0240  LDA $CD
0250  ADC #0
0260  STA $CD
0270  CLC
0280  LDA $CE
0290  ADC #40
0300  STA $CE
0310  LDA $CF
0320  ADC #0
0330  STA $CF
0340  DEX
0350  BNE LOOP2
0360  RTS
0370  .END
```

PROGRAM 2

STRING/SCREEN COMPARE ROUTINE

```
10  *=$600 ; RELOCATABLE
20 ; COMPARE STRING W/GR.8 SCREEN
30 ; (C)1986 JEFF BRENNER
40 ; FORM: A=USR(ADR(SSC$),ADR(A$))
50 ; WHERE SSC$ IS THIS ROUTINE
60 ; AND A$ IS STRING TO COMPARE
70 ; RESULT: IF PEEK(208)>0, NO MATCH
80  PLA
90  PLA
0100  STA $CD
0110  PLA
0120  STA $CC
0130  LDA #0
0140  STA $DO ; CLEAR $DO
0150  LDA 88
0160  STA $CE ; SAVE SCREEN ADR
0170  LDA 89
0180  STA $CF
0190  LDX #192 ; 192 LINES
0200 LOOP2 LDY #39  ; 40 BYTES/LINE
0210 LOOP LDA ($CC),Y ;GET STRING VALUE
0220 CMP ($CE),Y ;COMP. W/SCREEN VALUE
0230  BNE END ; IF NOT EQUAL, END
0240  DEY
0250  BPL LOOP
0260  CLC
0270  LDA $CC
0280  ADC #40 ; NEXT STRING "LINE"
0290  STA $CC
0300  LDA $CD
0310  ADC #0
0320  STA $CD
0330  CLC
0340  LDA $CE
0350  ADC #40 ; NEXT SCREEN LINE
0360  STA $CE
0370  LDA $CF
0380  ADC #0
0390  STA $CF
0400  DEX
0410  BNE LOOP2
0420  RTS
0430 END INC $DO ; SET $DO TO 1
0440  RTS
0450  .END
```

PROGRAM 6

Real Estate continued from page 187

MILES CONSULTING, INC.
504-833-2473
*FASTBUCKS
After tax income property analysis package. Calculates an after tax internal of return or investment value. Constructs operating statements, and projects after tax cash flows.
IBM PC - 128 KB req. - Introduced: 1982 - Cost: $100.
*FASTFANNY
Single family house valuation package. Aids in the completion of the FNMA 1004 Residential Appraisal Report forms. Helps the appraiser do an analysis of each comparable sale.
IBM PC - 160 KB req. - Introduced: 1984 - Cost: $100.

MIRACLE COMPUTING
913-843-5863
*PROPERTY MANAGER
collection of programs for the property management business. Includes data base and accounting components. Allows customized tenant, owner, maintenance, and sales/marketing data bases.
IBM PC, XT, AT - 256 KB req. - Sample diskettes avail. - Copies sold: 45 since 1982 - Cost: $350-$1,000.

NATIONAL MICROWARE
714-752-2344
*Real Estate Professional
Client management package for real estate industry. Functions provided include data base management, farm management, listings, buyer/prospect management, escrows, time management, correspondence, and expense record keeping. Includes a tickler system for follow-ups.
IBM PC - 256 KB req. - Cost: 395.

NATIONAL REAL ESTATE EXCHANGE, INC.
Systems Division
305-647-6739
* DPS/11 NRE Analysis and Finance Programs
Real estate applications library of finance and analysis programs. Twenty-eight programs used by commercial/investment real estate brokers, appraisers, accountants, attorneys and investment analysts. Handles numerous loan repayment schedules, IRR and FMRR computations, cost recovery schedule, sale proceeds after taxes, loan analysis programs, installment sale year analysis, investment base/acquisition basis, comparative and individual tax analysis, federal tax schedules and income property factors.
IBM PC, XT, AT - 64-128 KB req. - Copies sold: 250 since 1978 - Cost: $1,495-$2,295
*DPS/12 SUPERCASH Investment Cash Flow Analysis
Investment cash flow analysis and yield program for the commercial/investment real estate broker, appraiser, accountant, attorney and investment analyst. Computes and analysis of after tax cash flows and yields of an investment for holding periods of up to 30 years, up to 20 loans, separately definable incomes and expenses, and up to 20 depreciation/cost recovery items. Calculates after-tax cash flows and yields from current IRS tables based upon investor reporting method and otherwise taxable income.
IBM PC, XT, AT - 64-128 KB req. - Copies sold: 250 since 1978 - Cost: $1,495-$2,295

PACIFIC COMPUTER
619-563-1835
*MINI-STOR
Self-storage management system. Allows property manager to maintain tenancy of self-storage units. Selections an processes include rent a space, vacate a space, invoicing, history and status reports and delinquency processing with dunning notice.
IBM PC - 64 KB req. - Sample diskettes avail.- Copies sold: 10 since 1983 - Cost: $1,250.
*Title Foreclosure system
Legal documents preparation system. Collects legal information into a data base which is processed daily to determine the reconveyance status of each trust. Each step in the trust foreclosing procedure includes letter, notices and legal documents which are created by the program as scheduled by the user and printed upon request.
IBM PC - 64 KB req. - Sample diskettes avail. - Copies sold: 1 since 1983 - Cost: $3,000

PORTABLE SOFTWARE, INC.
415-367-6264
*Property Management System
Addresses the needs of the professional property manager who may be administering apartments, condo and townhouse associations, office premises or any combination of rental or managed properties. Covers all areas concerning the recordkeeping and control of properties and their tenants. Accounting system; keeps detailed records of payments, receipts and amounts due.
IBM PC, XT, AT - 64 KB req. - Sample diskettes avail. - Copies sold: 200 since 1980 - Cost: $2,4000

POWERSOFT, INC.
609-589-5500
*Real Estate Analysis
Analysis system for buy/sell decisions, time to hold for optimal rental and commercial investment. Generates depreciation schedules. Provides routines to aid in banking, real estate, investments, leasing, securities and insurance.
IBM PC, XT - 64 KB req. - Copies sold: 500 since 1981 - Cost: $100.

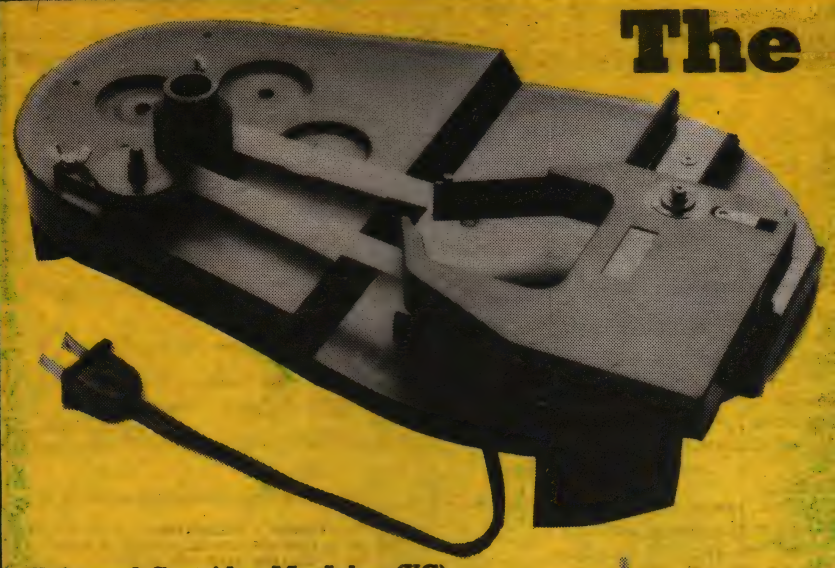
PRC REALTY SYSTEMS
(division of Planning Research Corp.)
703-556-2500
*PRC ExecuPro Real Estate Office Accounting
Provides general ledger accounting, printed statements and financial reporting. Uses company dollar format to produce financial statement for the audit trail. Chart of accounts can be modified to suit and individual firm's needs.
IBM PC, XT - 128 KB req. - Sample diskettes avail. - Copies sold: 100 since 1983 - Cost: $720.
***PRC ExecuPro Sales Management Enables that real estate broker/manager to manage listings and agent performance, and analyze sales activity and project income. Allows the user to track listings through settlements. Listings held or sold by outside offices may also be tracked.**
IBM PC, XT - 128 KB req. - Sample diskettes avail. - Copies sold: 100 since 1983 - Cost: $720.
* Real Estate Work Processing
Office automation tool created for the real estate office. May be used to produce general correspondence, client follow-up letters, farming letters, sales contracts, office memos and reports. Customized documents can be merged with mailing lists to produce personalized letters to prospects,or address labels.
IBM PC, ST - 128 KB req. - Sample diskettes avail. - Copies sold: 100 since 1983 - Cost: $370
* Residential Financial Analysis
Analysis and presentation tool for sales associates which performs calculations including amortization, closing cost and investment analysis calculations. Calculates amortization on seven loan types. equity analysis, real cost of ownership, closing costs and projected income for residential investment properties. Has communications ability featuring dial-up for MLS or other on-line services.
IBM PC, XT - 128 KB req. - Sample diskettes avail. - Copies sold: 100 since 1983 - Cost: $500.
*Residential Property Management
Property management tool for tracking owners, tenants, properties. transactions and trust account balances. Designed of offices managing less that 500 properties. Can report on cash receipts and disbursement activity, current trust account balances, tenant rolls, tenant delinquency status and operating statements.
IBM PC, XT - 128 KB req. - Sample diskettes avail. - Introduced: 1984 - Cost: $795.

PROFESSIONAL MICRO DESIGN
713-493-5218
*HUD Professional
Real estate property management software for HUD projects. Performs tenant accounting, HUD reporting, property management and financial reporting functions.
IBM PC - 128 KB req. - Cost: $995.

REAL-COMP, INC.
408-996-1160
*Real Analyzer
Real estate analysis program can be used by real estate professionals,income property investors, homeowners and tenants. Helps the user decide when to refinance, buy, sell or exchange a home or income property by projecting cash flow, R.O.I., and profitability before and after taxed. Permits a user to compare properties, evaluate alternative financing, structure loans to meet special needs compare renting vs.
IBM PC, XT, AT, PCjr - 48 KB req. - Introduced: 1983 - Cost: $195
*** Real Property Management Records and projects 12 months of income, expenses, profit, cash flow and bank balance for apartments, offices, mini storage units, condominium associations and other**

continued on page 191

The Universals Are Here!!



Universal Cartridge MacInker (UC)



Universal Spool MacInker (US)

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Now the **Universal Cartridge MacInker (UC)** will re-ink just about all fabric cartridges. Operation is extremely simple and automatic with new twin-drive electric motor that supports CW and CCW rotating cartridges. With most cartridges you do not even have to touch the ribbon when mounting the cartridge on MacInker (UC). We have an automatic timer available - you dial the time corresponding to the ribbon length and come back to a fresh ribbon.

The **Universal Spool MacInker (US)** supports over 350 brands of spools, We also have **Dedicated MacInkers** for any special cartridge or ribbon: Harmonica Type, Zip Pack etc. Following customer demand we have introduced a **Universal Spool MacInker (US)** with adaptor for all **Epson** cartridges.

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We have over 40,000 MacInkers in the field. A testimonial from one of our first customers 3 years ago, perhaps, sums it all up: "I used Mac Inker and put the cartridge back in the printer. When I saw it print I thought it was magic".

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MacInker™

Dealers inquiries welcome.

Randy's Ravings continued from page 60

on. Many of these people are first time users and they may not know about a local user group in their area. Therefore they are forced to rely upon mail-order firms to obtain the items they need to make their systems useful. For most of the old timers the following information will be a repeat of things they have heard and seen before, but since many people are seeing this for the first time, I want to share with you some extremely important information regarding purchasing items thru the mail.

Things to check before sending your money. One of the first things to do, and perhaps the most important, is check with other TI users that you know and with your local users groups. Also inquire on the commercial networks (CompuServe, Source, Delphi, etc.) and local BBS for information on how the particular company does their business. Ask if customers are satisfied with the service obtained from the company. For quite a while a few firms have engaged themselves in very questionable activities regarding sale of software, ranging the gamut from selling public-domain software to outright piracy. As an example, a retail outlet in my area sold copies of TI Forth for $25. TI Forth was given FREE to those users groups registered with TI at the time that TI distributed the "Care" packages to user groups. It seems ridiculous to pay $25 for something that was basically given away for free (even at cost to duplicate the disk and manual the charge would be well under $25) - but many novices are not aware of this fact.

Purchasing items thru the mail. Most of the dealers in the TI community are very honest and want your return business. However, there are some dealers who prey upon the unknowing and will take advantage of you. To protect yourself, here are some basic guidelines to follow when dealing with mail-order outfits:

1) Use a money order, check or credit-card for your purchase. Using a check or money order will at least give you proof regarding the fact that you sent them money, and also foreces the selling party to take specific action if an order cannot be delivered within a 30-day period (per the FTC rules.) Also, read the fine print for details about surcharges on credit-card purchases (this issue alone has generated much debate over its legality in many parts of the country), any additional shipping and handling charges, and so on. Finally, make a copy of the order form or letter that you send in for future reference. The February issue of *Consumers Reports* does a nice job in explaining how to approach mail-order outfits. If you deal with one of our mail-order advertisers and you run into trouble please let us know! (See our "Publisher's Statement on Honesty" which is in the front of the magazine by the contents page.)

If you buy software thru the mail, make sure that the dealer you buy it from is authorized to sell the product. It has come to light that a software "grey market" is emerging which could put you in a bind. If you can order software DIRECTLY from the publisher, do so, even if it means paying a higher price. Ordering direct from the publisher usually insures that you will be placed on the vendor's mailing list for future updates and/or bug fixes, plus (at least for now) it's pretty rare that a software author will not sell directly to the public; at least in the TI 99/4A community.

Speaking of selling software, selling your own software has gotten quite tricky and nasty as of late, hence the growth of the "shareware/freeware" concept, whereby "donations" are given to the authors of a program package when a person feels that the program acquired is of useful benefit to him. Not all freeware programs are entirely successful; sometimes a freeware package that you get may be missing documentation or a key programs that make the package work. Fortunately, most of the freeware code floating around is not copy-protected, therefore you can put the code on a "master" system disk and have it ready without having to swap disks.

If you want to have a 3rd party sell your software then its time to do some serious thinking and consult a lawyer before you sign anything. This goes without saying because of the rampant piracy present. Also, be wary of "consignment" agreements and establish a method of being able to easily identify legal copies of your software without the pirates knowledge and make it passive and (perhaps) separate from amy copy protection scheme that you may (or may not) want to incorporate. More than likely itchtification may not stop the "casual" pirate, but it can be useful should someone go into full-scale piracy, as proof in a legal suit. Having the individuals sending in a registration card is also useful, providing that the same guidelines above are followed. Of course, you can always go into business for yourself and sell your wares direct as a part-time activity, which (if successful) could lead to other greater things.

Tieing Up Loose Ends

I am pleased to report that newsletters from the Deleware Valley Users Group, the Charlotte TI 99 Users Group and Mid-South 99ers, as well as the Central Arkansas Forth Interest Group are winding their way here to the *Shopper* and from what I've seen so far looks promising. One of my dreams (unfulfilled) would be to develop a centralized database containing a complete cross-reference of articles published in the many newsletters from around the country which could be made available on one of the major networks. If the articles were placed on disk and sent to a central location for processing this could make retreiving information for a specific topic real easy and at minimal effort. If there is enough interest from the User Groups newsletter editors and from you, the users drop me a line here or any of the networks I frequent (CIS: 73137,3263; Delphi: RANDYH, GEnie: RHOLCOMB) and we'll take it from there and see if there is enough interest in pursuing this item further.

When *BYTE* bites, it BITES!

I am still receiving mail fromour mention in Steve Ciracia's feedback column, and it's coming from around the world asking for technical assistance and in locating peripherals and products. Your best bet is to contact your local TI Exchange Center to obtain a list of local users groups which are one of the best sources of information. The *Computer Shopper* is still one of the best places to look for many pieces of equipment, but unfortunately very few dealers take out ads telling you that they have TI-specific peripherals. So until the dealers see the light, look in the back of our classified section for systems for sale/wanted and don't dawdle - items there won't last very long! If you have a local dealer who sells TI 99/4A equipment and supplies have them contract our sales staff for our rates.

By the time you read this t he Third-annual TI-Fest West in Los Angeles (March 1st and 2nd at the Shrine Exposition Hall) would have come and gone, so watch the next month's issue for an update on what went on there. For you East Coasters, the TI Computer Owners' Festival (TICOFF) is slated for March 15th at the Roselle Park High School in Roselle Park, NJ, just south of Newark, aout 2¼ hours from the Christiana Mall and near a Route 22 exit off the Jersey trunpike. The New England 99 Fayuh (Honest, folks, that's what it's called!) hits Lexington, MA, on Saturday, April 5th at Diamond Junior High School (off Route

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Expanding The Heath/Zenith continued from page 74

hard disk booted, DOS came up, and I got a prompt. All the diagnostic LEDs on the mother board went out, and I was in business.

I could then run all kinds of software (like the benchmarks in the Feb. issue) at speeds unheard of before. For example, MicroSoft WORD, (one of the most lethargic WPs I've ever seen) was scrolling like a whole new program before my eyes...for about 5 minutes!

Then....CRASH!!!!!....the whole mess either went berserk or locked up. If I shut the machine off and turned it back to 4.77, it would boot and run fine at the lower speed. If I let the machine sit off for quite a while, could come back, boot at the higher speed and run for another 5 minutes, and then (again) CRASH!

Why Doesn't It Work?

The CPD module speeds up the entire system clock, so a lot of parts (not just the CPU) are running at higher speeds than they are certified for. All of the internal chips of the 150 are only rated at 5Mhz or so. They would work at the higher clock speed until they get good and warmed up (which takes about 5 minutes), and then.... CRASH!!!!

If you are very fortunate, you will get a machine where all the internal chips are "over spec" and able to handle the higher 6.66 Mhz clock. If you are like most people that I've talked to, your 150 probably has several chips that are just not capable of handling the higher speeds. If so, there appears to be a possibility of replacing some of them with chips rated at higher clock speeds.

It seemed to me that the "culprit" could be either the 8088, one or more of the 8000 series support chips, the RAM chips, or possibly the BIOS EPROM chips. I have tried replacing the 8088 with an 8 mhz V-20 version. It ran just like the stock 8088, everything wass fine for about 5 minutes and then....(you guessed it)...Crash!!! So, I assume that the 8088 isn't the culprit (or at the least the only culprit). I took out the hard disk controller (CPD suggests that certain hard disk controllers can cause problems) and ran the machine as a "floppy only" system. Well, it didn't help. The thing still went.....(here it comes)...CRASH!!! I also replaced the standard RAM chips with prime guaranteed 120 ns. chips. It had no effect on whether the system crashed or not.

Two things I was unable to do might also help. If you replaced all the support chips with 8 mhz versions, it might solve the problem. If that doesn't solve the problem, the last thing to look at is the BIOS EPROMs. It may take "reburning" them into faster version EPROMS to solve this problem. If *these* things don't solve the problems then I think it would be best to give up on the whole thing!

CPD's "Customer Service" (or Lack Thereof)

Even though they fulfilled my request for a review sample to test, I, too, was a little disappointed with CPD's customer service. They do not provide a phone number for service support and are very slow in filling orders and answering letters. They claim that the overwhelming response for the Time Works module has swamped their resources. The apparent reason for this is that CPD is actually a "homebrew" operation run by Heath/Zenith hobbyists. While there is a tendency to excuse a "hobbyist," CPD needs to realize that it's customers deserve better service for their money.

I had some of the same problems that Ted Robinson describes, and wrote CPD for help. I didn't get a response for several weeks. When it did come, it merely said, "... currently researching this problem....it is possible to run the basic machine as fast as 7.4 Mhz...initial testing functioned very well at that speed."

For now, if you are starved for speed, I recommend that you stick with adding a "V" chip or try the CPD Time Works board, *on a quaranteed money-back basis*, only. If your particular machine can run the higher speed with no problem, you've got a inexpensively upgradable machine. If not, it may be less expensive to add a new CPU board (in the long run).

For what it will cost you to replace all the chips on your cPU and RAM board with higher spec chips, you could probably buy a "stand alone" co-processor board. You could also probably buy the (true) 8 Mhz CPU board for the 158 for less money. These are both possibilities that I am exploring and will report on in future articles (as well as some other speed-up boards that are "in the works"). ●

Real Estate
continued from page 189

properties. Handles unlimited number of properties. Can be used by investors and property managers. IBM PC, XT, AT - 192 KB req. - Introduced: 1984 - Cost: $395.

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Randy's Ravings
continued from page 190

128/95, outside of Boston.) It is being sponsored by the Boston Computer Soceity TI Users Group. For the latest information on this you can call their BBS at (617) 331-4181 (300/1200 bps, 24 hours.)

Other TI News

Navarone Industries has been acquired by another company and has been relocated to Texas. Their new Phone number is (214) 437-1118. Navarone produces software for the 99/4A, with Disk Fixer their best-known item.

In Closing

It's been quite an experience doing a monthly column for and about TI Computer and their users. With Ron and Jon coming aboard it will strengthen what was started when Black Friday hit and TI disappeared as support. So far, we have done the best we could given the circumstances, and yes, we have fallen down on a number of occasions. But it is important to emphasize that even this media is just not a one way street. For every one letter there must be at least 10 or 20 other people who read this section and who could provide some insight or could have a particular area explored further. In many respects, this is a job for more than just one person, and that need has now been recognized. And once again I must state that I am not "dropping" out of TI coverage. But myself, Ron and Jon can only do so much. The rest of what needs to be done: for new users and experts alike, has to come from you. It's sorta like the old saying that "We have done so much with so little for so long that we can do practically anything with nothing forever." Guess what? There's still more to do. Watch us. ●

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That Dangerous Thing Program

BASIC CODE FOR TYMON'S TUTOR

```
10   ' TYMON'S TUTOR, VERSION 1.3, 860108
20   ' COPYRIGHT 1986, FRANK TYMON
30   gosub CLEARIT
50   ? "TYMON'S TUTOR"
60   ?
70   gosub PAUSE
80   clearw 2
     gosub EXPLAIN:
100  gosub INITMUSIC
110  for zz=1 to 10000:next zz
120  COLOR 1
130  INTRO:
140  clearw 2:fullw 2
150  ' This is an easily used learning program
160  ' It is based upon an original program copyrighted in
1981
170  ' by the author, Frank Tymon
180  clearw 2
190  clear
200  INITIALIZE:
210  input "input record file name ",r$
220  print r$
230  gosub PAUSE
240  clearw 2
250  ' open file 1 to access/save records
260  open "R",1,r$,68
270  field 1,2 as key$,6 as dt$,15 as wd$,45 as meaning$
280  color 2
290  knt=lof(1)
300  color 1
310
'************************************************************
320  SELECT:
330  COLOR 2
340  input "input SHOWME to display all records ";it$
350  if it$="SHOWME" then gosub SHOWME
360  PICK:
370  input "input 1,2, or 3-to correct, add to disk, read
from disk,";sel
380  if sel<1 or sel>3 then goto PICK
390  if sel=1 then goto FIXIT
400  COLOR 1
410  if sel=2 then knt=lof(1)+1
420  ' sub READBACK permits reading; DONE ends routine
430  if (sel=3) then gosub READBACK:goto DONE
440
'************************************************************

450  INGO:
460  ' next section allows entry of data under key 1
470  COLOR 2
480  input "input date (MMDDYY) ";dte$
490  COLOR 3
500  print "key is 1 for data entry."
510  ? "to stop, enter ";:color 2:? "last,a,a":color 1
520  gosub INMUSIC
530  COLOR 2
540  MORE:
550  input "input key, word, meaning"; ky$,wrd$,mn$
560  if ky$="last" then goto WHATNOW
570  if val(ky$)<>1 then goto MORE
580  ' next section writes record
590  lset key$=ky$:lset dt$=dte$:lset wd$=wrd$:lset
meaning$=mn$
600  put 1,knt
610  knt=knt+1
620  goto MORE
630
'************************************************************
**
640  WHATNOW:
650  COLOR 1
660  ' next section displays records
670  clearw 2:for g=1 to lof(1):get 1,g
680  COLOR 3
690  print key$,dt$,wd$,meaning$
700  next g
710  DONE:
720  close 1: COLOR 1:END
730  '
'************************************************************
***
740  READBACK:
750  ' next section reads records by selected periods
760  clearw 2
770  COLOR 3
780  PERIODSELECT:
790  ? "for day, the initial input, enter 1"
800  ? "input following numbers (2,3,4,5,6 for week,
month,"
810  ? " quarter, semi-annual, and annual reviews)";
820  color 2
830  input psel
840  if psel<1 or psel>6 then goto PERIODSELECT
850  per$="1 ":if psel=2 then per$=" 2"
860  if psel=3 then per$=" 3"
870  if psel=4 then per$=" 4"
880  if psel=5 then per$=" 5"
890  if psel=6 then per$=" 6"
900  COLOR 1
910  lst=lof(1)
920  rec=0
930
'************************************************************
********
940  BITMORE:
950  rec=rec+1
960  if rec=lst+1 then RETURN
970  get 1, rec
980  akey$=key$
990  for z=1 to 300:next z
1000 if (akey$<>per$) then goto BITMORE
1010 ' next section tests you on word
1020 clearw 2
1030 COLOR 2
1040 gotoxy 5,5:? meaning$
1050 for i=1 to 300:next i
1060 COLOR 1
1070 gosub HOWWELL
1080 goto BITMORE
1090 '
'************************************************************
1100 HOWWELL:
1110 clearw 2
1120 ' next section determines success of test
1130
'************************************************************
*
1140 RESPOND:
1150 COLOR 2
1160 ? "to end, enter LAST"
1170 input "input word ";wrd$
1180 if wrd$="LAST" then close 1:color 1:END
1190 buff$=wd$
1192 gosub TRUNCATE
1195 if len(wrd$)<>len(buff$) then goto BAD
1200 zb=instr(0,buff$,wrd$)
1210 if zb<>0 then gosub SUCCESS:goto JUMPBACK
1215 BAD:
1220 clearw 2
1230 COLOR 3
1240 gotoxy 5,5:? wd$
1250 gotoxy 5,10:? meaning$
1260 gosub PAUSE
1270 gosub SORRY
1280 gosub LOSEMUSIC
1290 COLOR 1
1300 lset key$="1 "
1310 put 1, rec
1320
'************************************************************
1330 JUMPBACK:
1340 RETURN
1350
'************************************************************
1360 SUCCESS:
1370 a%=val(key$):if a%=6 then lset key$=" 6":put
1,rec:return
1380 lset key$=str$(a%+1):put 1,rec
1390 JUMP:
1400 gosub CONGRAT
1410 gosub WINMUSIC
1420 RETURN
1430
'************************************************************
**
1440 EXPLAIN:
1450 clearw 2
1460 COLOR 2
1470 ? "This program allows the user to input a list to be
learned.
1480 ? " The corresponding -answer- to the list is also
entered.
1490 ? "The contents are successively transferred to files
which
1500 ? " will be accessed less and less frequently as the
user
1510 ? "becomes familiar with and understands the content.
1520 ? " Thus he spends time learning and reviewing only
what
1530 ? " is of value to him.
1540 return
1550 '
'************************************************************
1560 PAUSE:
1570 for az=1 to 500:next az
1580 return
1590
'************************************************************
1600 INITMUSIC:
1610 wave 7,5,15,10,25
1620 for s=1 to 5
1630 sound 1,15,2,8,10
1640 sound 1,5,2,8,5
1650 sound 2,15,3,2,20
1660 sound 2,5,3,2,10
1670 sound 3,15,3,4,10
1680 sound 3,5,3,4,5
1690 sound 3,5,3,4,5
1700 sound 3,5,3,4,5
1710 next s
1720 sound 1,0,0,0,0
1730 sound 2,0,0,0,0
1740 sound 3,0,0,0,0
1750 return
1760
'************************************************************
*
1770 INMUSIC:
1780 wave 7,0,0,0,5
1790 for i=1 to 5
1800 sound 1,15,3,3,20
1810 sound 1,10,4,3,10
1820 sound 1,5,5,3,5
1830 sound 3,15,3,4,20
1840 sound 3,10,4,4,10
1850 sound 3,5,5,4,5
1860 sound 2,15,3,5,20
1870 sound 2,10,4,5,10
1880 sound 2,5,5,5,5
1890 next i
1900 sound 1,0,0,0,0
```

program continued on page 194

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That Dangerous Thing continued from page 143

cue. This is easily modified by changing those lines involving Open and Field.

Analysis Of Tymon's Tutor

The program is rather long, but it is divided into a sequence of logical modules, simplifying both programming and understanding. There are several modules which exercise the sound capability of the Jackintosh. These are represented by the module, INITMUSIC. (By the way, each module is identified by having its title in capital letters.)

In INITMUSIC, as well as the other routines using sound -- INMUSIC, LOSEMUSIC, WINMUSIC -- the first line establishes the characteristics of the wave. These entries can be confusing, as the Atari ST BASIC Sourcebook is a little unclear on their use. Note first that our inputs are in decimal form. Each numeric value is the equivalent of corresponding binary values. For example, in instruction Wave 7, 5, 15, 10, 25, the intiial 7 is equivalent to 00000111. On my machine this enables voices 1, 2 and 3, and precludes noise generation. This is exactly opposite the Sourcebook guidelines. The entries for envelope (5), and for shape (15) operate in the same manner. The latter two entries, 10 and 25, reflect the period and duration of the envelope in number of 1/50th second increments.

Under INITIALIZE the learning package file is identified, and a relative file (called in the Sourcebook and elsewhere, erroneously, a random file) is opened and the fields prescribed. SHOWME then permits the user to examine all the records on the learning package, inputting entries to the learning package, or correcting existing entries in the learning package. Note that, in using the relative files, entries are made first to a buffer record, using the LSET instruction. This is followed by outputting to the buffer with the PUT instruction. Similarly, the record is read from the disk to a buffer, using the GET instruction. The field contents can then be used. Field contents cannot be numeric entries. Before these can be used they must be converted to strings.

Prompts lead the user in placing entries on the disk. In general he will enter a 1 (indicating initial entry), the entry to be learned, and the entry to be displayed as a cue to the user. The process is repeated until the user enters the sequence: last,a,

Similarly, on using the package in a learning mode, the data is extracted from the disk, and the cue is displayed on the screen in red. The user is prompted to enter the appropriate response. If he fails to do so the correct information is displayed on the screen, at the same time the sound generator plays a sympathetic theme. If the entry is correct the system congratulates him, and the sound generator outputs a triumphant march. Eh, anyway, some noise. The record has its key changed to the next higher value. Thus, unless the user requests a key value of higher than 1, he will review only 1-coded records. He may ask for keys up to 6 (corresponding, in my use, to one year, where daily review is key 1, weekly is key 2, etc.) The learning mode is repeated until there are no more records to be read, or the user enters LAST. This activity is accomplished under the module READBACK.

While in the correction mode the module FIXIT dominates the activity, and permits either the required response field, or the display cue field, to be modified. It allows subsequent records to also be corrected. However, this is possible only for records which follow the current one on the disk. That is, the records are actually sequential. The access is relative. To actually be able to randomly select records we would need a second file which would contain a key for selection, and a relative record number. We could then find the key in this file, and read the relative record associated with it. Our current program doesn't provide this, although it is a simple exercise to develop the capability.

This has been a thumbnail sketch of the program. By reviewing the code, running the program (both in learning package development and use), and analyzing the results you'll find that the process is straightforward.

Summary

The program permits you to tailor a sequence of learning sessions to your personal needs. Need to learn a specialized vocabulary? Using this program you can rapidly generate a file which can then be used for review -- but which only reviews those words you don't know. Unless, of course, you want to review all or a subset. Do you need to learn the capitols of the states? The same principle applies. Need to learn a foreign vocabulary? Again, you can develop a tailored program. You can develop a program to help you learn concepts, words, formulas, or any other information which can be entered into the system.

The program is designed to cover a variety of situations. Nevertheless occasions may arise where it isn't entirely satisfactory. The program is written in BASIC, and is widely commented. As a result, if needed, you may make changes which will increase the value of the package.

A commercial version of the package will soon be available. For readers who aren't too eager to type in the code there is available a package consisting of a 3½" disk containing the program and an extensive English vocabulary learning package. This is accompanied by a complete set of instructions, a list of the English vocabularly file (other learning packages are being generated), and a list of the tutor.bas program. The package is available for $25.00 from: Frank Tymon, 4749 W. K-12 Ave., Lancaster, CA 93536. ●

Program continued from page 192

```
1910  sound 2,0,0,0,0
1920  sound 3,0,0,0,0
1930  return
1940
'*****************************************************
1950  CONGRAT:
1960  gotoxy 5,5
1970  color 2:? "CORRECT--CONGRATULATIONS"
1980  return
1990
'*****************************************************
2000  WINMUSIC:
2010  wave 7,0,0,0,20
2020  for j=1 to 3
2030  for i=1 to 3
2040  sound 1,15,3,3,1*i
2050  sound 1,5,3,3,1*i
2060  next i
2070  for k=1 to 100:next k
2080  next j
2090  sound 1,0,0,0,0
2100  color 1
2110  return
2120
'*****************************************************
2130  SORRY:
2140  gotoxy 5,2
2150  color 2:? "WRONG--SORRY"
2160  return
2170
'*****************************************************
2180  LOSEMUSIC:
2190  wave 7,0,0,0,25
2200  for ab=1 to 3
2210  for i=1 to 3
2220  for j=1 to 3
2230  sound 1,5*i*j,5-j,1*i*j
2240  sound 1,15/i*j,1+j,1*i*j*5
2250  next j:next i
2260  sound 1,0,0,0,0
2270  next ab
2280  color 1
2290  return
2300
'*****************************************************
2310  FIXIT:
2320  nm=lof(1)
2330  NEXTDEL:
2340  color 2
2350  ? "input the required response field to locate record"
2360  ? "the required response field is entry you ordinarily
will return"
2370  ? "in response to the displayed cue."
2380  input "input the entry here: ",rr$
2390  for i=1 to nm
2400  get 1,i
2410  tag$=wd$:k$=key$:date$=dt$:mn$=meaning$
2420  if (instr(0,tag$,rr$)=0) then goto SHLOGON
2430  color 3
2440  print k$," ";date$," ";tag$," ";mn$
2450  color 2
2460  ADJUST:
2470  ? "input 1,2,3, or 4 to go to next record, discontinue
changes,"
2480  input "change required response field, or change
meaning field ";asel
2490  if asel=1 then goto NEXTDEL
2500  if asel=2 then close 1:END
2510  if asel=3 then goto DELWORD
2520  if asel=4 then input "input meaning ";mn$:goto REENTER
2530
'*****************************************************
2540  DELWORD:
2550  input "input word ";tag$
2560
'*****************************************************
2570  REENTER:
2580  lset key$=k$:lset dt$=d$:lset wd$=tag$:lset
meaning$=mn$
2590  put 1,i
2600  goto NEXTDEL
2610
'*****************************************************

2620  SHLOGON:
2630  next i
2640  close 1
2650  color 1
2660  END
2670
'*****************************************************
**
2680  CLEARIT:
2690  for i=0 to 3
2700  fullw i:clearw i
2710  next i
2720  RETURN
2730
'*****************************************************
**
3020  SHOWME:
3030  clearw 2
3040  for qu=1 to lof(1)
3050  get 1,qu
3060  color 3
3070  print key$,dt$,wd$,meaning$
3080  next qu
3090  gosub PAUSE
3100  RETURN
3110  TRUNCATE:
3120  n=15
3130  b$=right$(buff$,1)
3140  if (b$=" ") then n=n-1:buff$=left$(buff$,n):goto 3130
3150  RETURN
```

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The basic system you can expand with

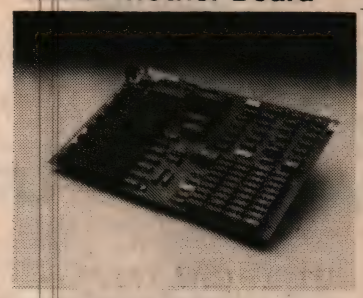
- A Nakai Computer Case, flip top, with same dimensions as that of the PC/XT.
- A PC/XT compatible Nakai Keyboard. Key switches by Misumi of Japan. Large return and shift keys. Capital and Number lock keys with LED.
- A Nakai Switching Power Supply. 135 Watts, side mount switch, 4 floppy power plugs.
- System packaging similar to IBM PC/XT.

Attention distributors and dealers!
We have 10,000 Basic Systems on scheduled shippments.
Call now for our low prices.

Nakai Offers you 1 year Manufacturer's Warranty on its 4 layer Boards compared to 90 days Warranty Offered by many of our Competitors.

- **Computer Soldered Board**
- **4 Layer Board**
- **1 Year Manufacturer's Warranty**

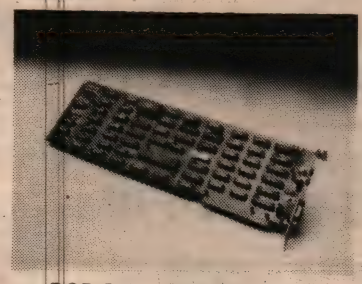
Nakai Mother Board



- 256 K Expandable to 640K on Board
- 4 Layer PC Board (Equal to IBM)
- (CPU) 4.77 MHz, 8088, 8087 Co-Processor Optional
- 8 Expansion Slots

Price : $239

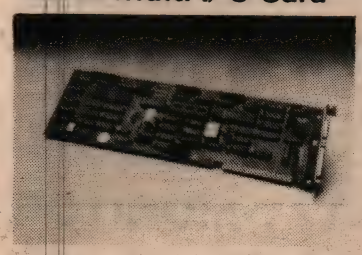
Nakai Color Graphic Card



- RGB Color, Composite, Monochrome Composite
- 4 Layer PC Board
- Text Mode: 40 Column x 25 Row, 80 Column x 25 Row
- Graphic Mode: 320 Dot x 200 Line (Color, Black & White), 640 Dot x 200 Line (Black & White)
- Attribute: Reverse Video Blanking & High Light

Price : $105

Nakai Multi I/O Card



- Controls 2 Floppy Disk Drives
- 4 Layer PC Board
- 1 Parallel Port
- 2 Serial Ports (1 Optional)
- Real Time Clock/Calendar
- Game I/O Port

Price : $135

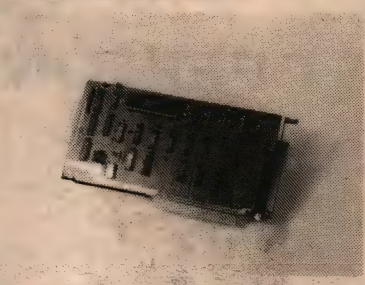
Nakai Monochrome Graphic Card



- With Parallel Printer Port
- Resolution: 720 x 348
- 4 Layer PC Board

Price: $109

Nakai Disk Controller Card



- Controls 4 Disk Drives
- (2 internal and 2 external) 4 Layer PC Board

Price : $ 49

Nakai Trans-Net Card



Nakai Trans-Net Card is a Comprehensive, High Performance, Low-Cost, and Easy-to-Use Local Area Network (LAN) for IBM PC/XT and Compatibles.

Nakai Trans-Net Local Area Network Transfers Data at 1 Million Bits Per Second Over A Twisted Pair Wire Cable Up to 4,000 Feet in Length, and as Many as 255 PCs can be Interconnected within A Network.

Price : $399

Nakai Mouse

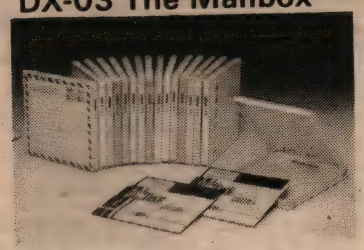


- Input speed higher than any devices
- No traditional grilled pad required
- Without using power supply adaptor
- No operating space limit
- IBM Compatibles.

With Software and Manual

Price: $99

DX-03 The Mailbox

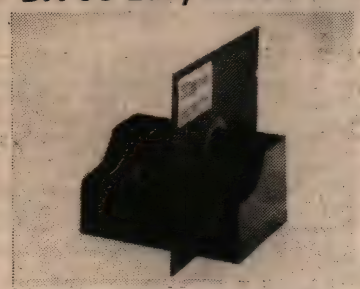


With software mailorder firms in mind, the MAILBOX was designed for mailing or transporting diskettes safely and inexpensively.

- Maximum 3 diskettes capacity.
- Rigid PS plastic structure.
- Mailing Label included.
- 4 colors for your selection.

Price: $1.00

DX-08 Easy Holder



Designed to keep multiple diskettes software both handy and in order, the EASY HOLDER is exceptionally convenient.

- Maximum 8 diskettes storage.
- Durable PS plastic body.
- Attractive color selection.

Price: $1.50

DX-100B Deluxe Diskette File



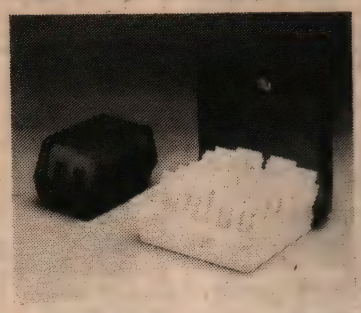
- Double row display filing system.
- Protective racks for diskette separation.
- Smoked PS plastic cover with lock.
- High impact plastic lid and base.
- Easy access handle for opening and carrying.
- One Hundred diskette capacity.

Price: $14.00

OEM, Distributor, Dealer Inquiries Welcome! Please Call for Quantity Price.

Visit us at Comdex Show Booth #4858 (West Hall)

SS-50 Diskette Holder For 3-½" Diskettes.

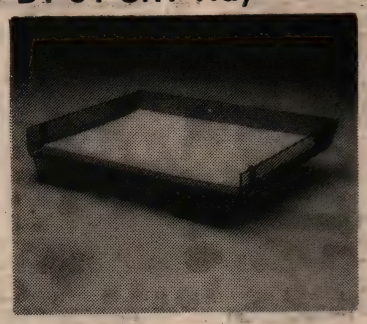


Special storage box for 3-½" diskettes.

- Capacity: 50 pcs 3-½"
- diskette.
- High impact plastic lid and base.
- Easy access handle for opening and carrying.

Price: $12.00

DT-01 CRT Tray

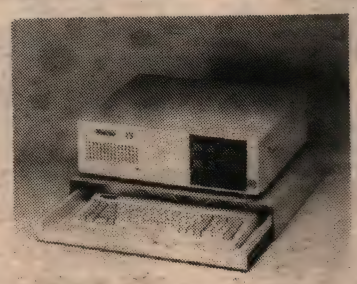


The way to bring your CRT up to peak effeciency! Fit this high impact plastic tray on top of CRTs to keep paperwork and printous neatly organized.

- Holds up to 500 sheets of paper.
- 4 rubber feet keep tray securely in place while letting air flow between the tray and CRT.
- Smart gray color.

Price: $6.00

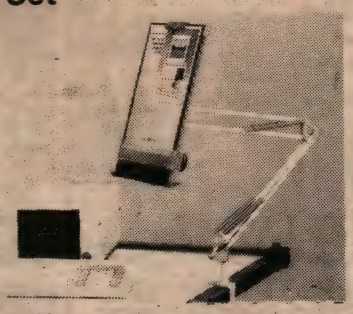
DT-21 DT Easy Drawer



Computer & CRT are supported by baked enamel, reinforced 20 gauge steel platform. The cantilever drawer, supported by ball bearing slides, holds a keyboard up to 2-¾"(h) x 19-¾"(w) x 9-½"(d), and extends to a lock position.

Price: $39.00

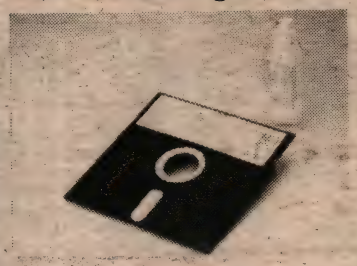
DT-32 Copy Holder With Adjustable Arm Set



- Copy holder set.
- Adjustable arm set, makes copy holder movable and easily adjustible to the position and angle most satisfactory to you.

Price: $15.00

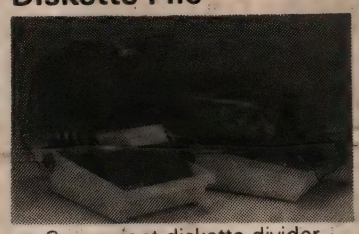
FD-05 Head Cleaning Kit



- Will not harm drive.
- Easy to use, insert like an ordinary diskette.
- Appropriate for both single and dual sided drives.
- 5-¼" cleaning diskettes.
- One bottle of cleaning solution.

Price: $5.00

DX-50AI Convenient Diskette File



- Convenient diskette divider
- Adjustable index tabs
- Smoked AS plastic cover with metal lock
- High-impact plastic base
- Easy access handle for opening and carrying
- Fifty diskettes capacity
- Packing dimensions: 28.5 x 16.5 x 17.5 cm

Price: $7.00

SPECIALTY OF THE MONTH

DX-100N Deluxe Diskette File



- Diskette display filing system.
- Protective racks for diskette separation.
- Smoked PS plastic cover with lock.
- High impact plastic lid and base.
- Easy access handle for opening and carrying.
- One Hundred diskette capacity.

Price: $13.00
Now: $ 8.00

DD-02 Disk Notcher



DD-02 DISK NOTCHER helps you save money by using the other flip side for backup copies.

THE DISK NOTCHER cuts write enable notch precisely & cleanly.

Price: $5.00
Now: $2.00

NAKAI

Z-NiX COMPANY, INC.

9537 Telstar Ave., Suite #121
El Monte, Ca. 91731
Tel: (818)575-3700

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Bulletin Board

BULLETIN BOARD

The **Bulletin Board** is a regular feature of *Computer Shopper*. This is where you can list your public access of community bulletin board at no charge. If you would like to have your name, BBS and phone number listed send it to us. BBS listings are in area code sequence.

Listings are good for three months. After that period they will be purged unless we receive a Post Card or Letter saying the board is active. In addition, any reader who contacts a board can confirm that it is active, but it is up to the SYSOP to keep us current.

Thank you.

Send listings to:
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Titusville, FL 32781

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AMIS Park Ridge, NJ 201-391-5519
APPLE OASIS, Chester, NJ 201-879-4392, 5pm-12am
ARMUDIC Washington, DC 201-276-8342
ATARI, Edison, NJ 201-549-7591
BACE BBS, Westfield, NJ 300/1200 Baud. 201-232-1730*
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THE BEACH, Bay Head, NJ 201-892-8172
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CFONJ/TBBS, Linden, NJ 201-486-2956, 300/1200 Baud *24
COCO CREATIONS, Jackson, NJ 201-928-9488 *24
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CONFERENCE THREE Flagship, Denville, NJ 201-627-5151 *24
DAVID'S PLACE, Hillsdale, NJ 201-666-7696 *24
DIAL-YOUR-MATCH #14 201-272-3686
EAGLES INN, Marlboro, New Jersey, 201-536-8206*
ENDIXX BBS, Matawan, New Jersey 201-583-4882 (3PM-10PM)
F.B.I., Neptune, NJ 201-922-9836 8am to 10pm--7days a week
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GALAXY III, Maplewood, NJ 201-763-5889 *24
GENERAL STORE, Hillside, NJ 201-666-2646 *24
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LE ??? SHOPPE, 300/1200, 201-747-8346 9PM-9AM
THE MAGIC BAG, Neptune, NJ 201-988-9489 *24
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PMS- Rutgers Univ. Microlab Piscataway, NJ 201-932-3887
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PIRATES NEST AE, Sussex, NJ 201-875-3384 300 BAUD. PW=DEVO; 9am-9pm 7days/week
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DIAL-YOUR-MATCH -7 213-840-8252
DIAL-YOUR-MATCH -9 213-345-1047
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DIAL-YOUR-MATCH -25 213-842-9452
DIAL-YOUR-MATCH -28 213-764-8000
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PMS O.A.C. Woodland Hills, CA 213-346-1849 *24
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RCP/M RBBS Palos Verdes, CA 213-541-2503 *24
RCP/M RBBS Softwar Store Los Angeles, CA 213-296-5927 *24
THE WARGAMES RBBS, Santa Monica, CA 300/1200/2400, 213-393-7227*

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ABBS Teledunjon Dallas, TX 214-960-7654

ABBS Teledunjon I Dallas, TX 214-530-0858
AMIS Allen, TX 214-727-2824 *24
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ANLN Dallas, TX 214-263-3109 *24
BBS-80 DALTRUG Dallas, TX 214-235-8784 *24
BULLET-80 Hawkins, TX 214-769-3036
COMPUTER RESET, Garland, TX 214-272-7920 8am-12am
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MICROSERVE (TBBS), Tyler, TX 214-581-3722. 300/1200/2400 *24
NET-WORKS Apple Grove, Dallas, TX 214-644-5197
NET-WORKS Apple Shack, Dallas, TX 214-644-4781 *24
NET-WORKS Electric Computer Dallas, TX 214-239-5482
NET-WORKS Winesap Dallas, TX 214-824-7455
RCP/M CBBS Dallas, TX 214-913-8274
TBBS OF TYLER, Tyler, TX 214-566-1374; 300/1200/2400 BAUD; Atari, TRS-80, Kaypro *24
T.R.A.I.N. BBS, Ennis, TX. Atari. 214-875-9818

AMIS BBS, Pennsylvania 215-333-3753
AMIS Pennsylvania 215-250-9471
AMIS Pennsylvania 215-432-9848
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C.B.M. ONLY, West Lawn, PA 215-678-7691 300 BAUD *24
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COMPCOM 215-968-0170 300/1200 *24
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LEHIGH PRESS BB, PA 215-435-3388
RBBS Pennsylvania 215-398-3937
RBBS Pennsylvania 215-836-5116
TIBBS Philadelphia, PA 215-927-6432 *24
TIBBS Reading, PA 215-929-5348
TI-TALK Reading, PA 215-372-1154; 300 BAUD *24

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ATARI Ohio 216-582-2797
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ATARI PRISM Akron, OH 216-867-2422
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THE BLACK HOLE 64 Elyria, OH 216-322-7184 9pm to 6am
BIG BOARD (CP/M) Akron, OH 216-745-7819
BULLET-80 Chesterland, OH 216-729-2769
CAMELOT ATARI BBS Akron, OH 216-864-7002 *24
CLOUD NINE, 216-650-2989 *24
COMNET-80 Akron, OH 216-645-0827 *24
THE COMMODORE ARCADIA, 216-644-1014, 11pm-9am est.
COMMODORE'S BRIDGE Akron, OH 216-929-1454
COMMODORE CHIP Akron, OH 216-678-5033 *24
COMMODORE CLIPPER Akron, OH 216-928-4123 *24
COMMODORE COMMANDER Akron, OH 216-923-0347
THE COMMODORE CRUSADER, 216-864-8924 *24
COMMODORE EXPRESS Akron, OH 216-253-9247
THE COMMODORE GATEWAY, 216-896-9001 *24
COMMODORE RAINBOW Akron, OH 216-644-5516 *24
COMMODORE REALM Akron, OH 216-666-9463, 10pm-7am est.
THE COMPUTER EXPERIENCE, Cleveland, OH 216-946-9076 *24
COMPU-CENTER, Akron, OH 216-929-4803 *24
COMPUTER EXPERIENCE 216-946-9076 *24
COPLEY ATARI Akron, OH 216-666-8961
THE DARK TOWER Rogers, OH 216-227-3245 *24
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FIRESTONE PARK ATARI Akron, OH 216-724-7760
THE FOURTH DIMENSION, 216-644-4597 *24
FORUM-80 Cleveland, OH 216-486-4176
THE GOLDEN KEEP, 216-896-9147 *24
HENRIETTA OUTHOUSE, Oberlin, OH 216-965-8151 8pm-7am
MEGA-FORCE BBS Akron, OH 216-699-9055
NEW AGE BBS Cleveland, OH 216-451-3280
NIGHT STALKER Akron, OH 216-376-6443
PIRATES DELIGHT Akron, OH 216-672-7580 *24
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PMS RAUG Akron, OH 216-867-7463 *24
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S.T.A.R. BBS -3, Akron, OH 216-753-5379
TBBS of Akron 216-724-2125 *24
TBBS OF SOUTH SUMMIT Akron, OH 216-724-1963 *24
TBBS OF TALLMADGE Akron, OH 216-633-7483 *24
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UNDERGROUND 64 Lorain, OH 216-282-8848 8pm-7am days
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MEGA NET BBS Mishawaka, IN 219-259-4366
TIBBS-LAKE COMPUTER DEPOT Whiting, IN 219-659-1245 *24

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COMMODORE MANIA! Potomac, MD 301-251-0599 *24
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HEX Silver Spring, MD 301-593-7033 *24
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PMS Ellicott City, MD 301-465-3176
also Laurel, MD 301-596-0123
SALISBURY TOWNE CRIER (SALTC) Salisbury, MD 301-543-8845

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KRICKIT Dover, DE 302-734-0179, 10pm-7am
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TIBBS Newark, DE 302-322-3999

A.M.I.S. Denver, CO 303-978-0298 *24
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AURORA NETWORKS Denver, CO 303-343-8401 *24
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BBS IBM PC, Denver, CO 303-773-2699 *24
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ATLANTIS, 305-920-6203 *24
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THE PINNACLE BBS, Hollywood, FL 305-922-4440 *24
QUILL, AMIS BBS Palm Bay, FL 305-724-2303
RBBS HEATH KIT 305-823-2281 6pm-8am
RBBS SOUTHERN MICRO 305-625-3181 *24
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SPACE SHUTTLE BBS (SSBBS) Satellite Beach, FL 305-777-4714 *24
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SASKATOON TEXAS INSTRUMENTS COMPUTER CLUB, SASKTOON, SASK 306-384-2844

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NET-WORKS MAGIE Galesburg, IL 309-342-7178
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THE WAR-ZONE BBS, East Peoria, IL 309-699-0901

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AMIS Chicago, IL 312-789-3610 *24
AMIS Lombard, IL 312-620-6441
ANLN Chicago, IL 312-253-9789 *24
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CBBS Chicago, IL 312-545-8086 *24
CBBS Chicago, IL 312-876-0974
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CLAUG 312-457-2219
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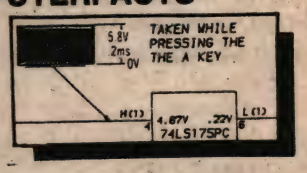


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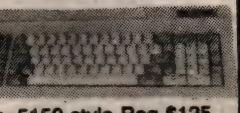
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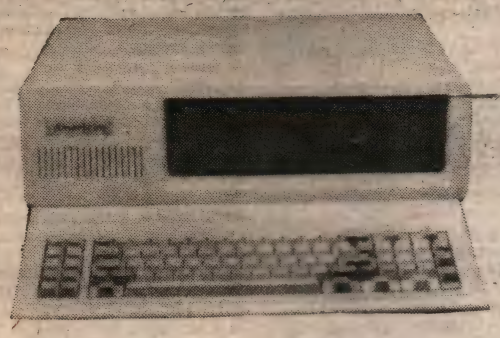
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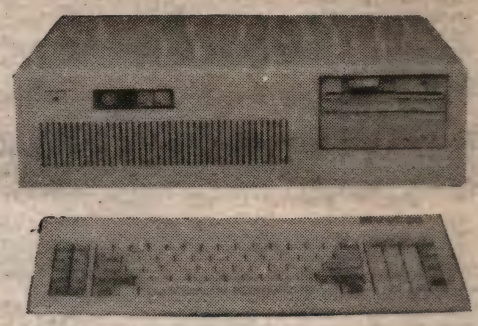
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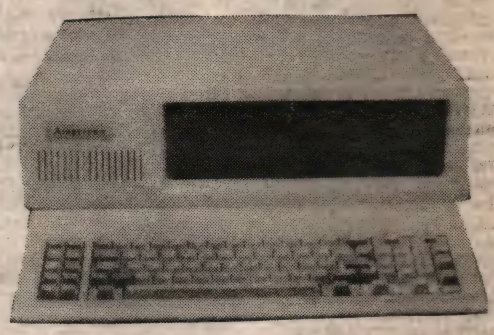


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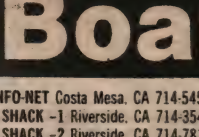
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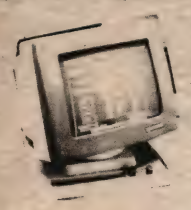
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Coming Events

If you know of or have a trade show, swap meet or club meeting connected with the computer field, we'll run an announcement in the COMING EVENTS section FREE of charge.

MARCH 16, 1985
AMATEUR RADIO/COMPUTER FLEA MARKET will be held at The American School for the Deaf in West Hartford, CT. Talk-in will be on 146.28/88. Doors open at 9AM until 3PM. Tables $10.00, call early to reserve in advance. Contact Chuck Motes, K1DFS 22 Woodside Lane Plainville, CT 06062 or (203) 747-6377 evenings.

MARCH 19-20, 1986
TWELFTH ANNUAL COMPUTER FAIR will be held at the University of Washington, Seattle, Washington. This fair will be sponsored by University of Washington Academic Computing Servies. For additional information contact Dr. Thomas Bennett at (206) 543-5728

MARCH 19-21
PERSONAL COMPUTER INTERFACING WORKSHOP for Scientific Instrument Automation, from Virginia Tech; held in Blacksburg, Va.; directed by Mr. David E. Larsen and Dr. Paul E. Field. $495. 3 days. Hands-on workshops with each participant wiring and testing interfaces on the IBM-PC and other personal computers. Call or write Dr. Linda Leffel, C.E.C., Virginia Tech, Blacksburg, VA 24061, (703) 961-4848.

MARCH 23, 1986
CHERRY HILL COMPUTER FAIR will be held at the Holiday Inn, Cherry Hill, NJ. The Show is open to the public from 10am to 4pm. For more information call, (201) 533-1991

MARCH 23-26, 1986
THE FIFTEENTH INTERNATIONAL TI-MIX CONFERENCE AND TRADE SHOW, "Achieving Your Potential" will be held at the Lowes Anatole Hotel in Dallas, Texas. It focuses on the powerful vehicle that TI-MIX provides for users: how to take full advantage of Texas Instruments computers and peripherals. For further information contact TI-MIX, M/S 2200 CC052, PO Box 2909, Austin, Texas 78769

MARCH 24-27, 1986
14th ANNUAL INTERFACE '86 Conference and Exposition will be held at the Georgia World Congress Center in Atlanta, GA. More than 300 companies are expected to display and demonstrate computer systems and communications services for large-scale corporate, government and institutional users. For further information contact The Interface Group, 300 First Avenue, Needham, Massachusetts 02194

MARCH 26-27, 1986
THE LOTUS DEVELOPER CONFERENCE will be held at the Hyatt Regency Hotel in Cambridge, MA. The Lotus Developer Conference is a forum where developers can meet with industry experts and Lotus personnel to share ideas and expertise, and hear about: state of the art technologies, tips/techniques for successful applications development, Lotus news and 1986 strategies, and much more. For additional information contact Mark Scapicchio at Lotus (617) 577-8500 x 8226.

APRIL

APRIL 1-3, 1986
THIRD ANNUAL COMDEX/WINTER
The winter edition of the world's largest computer industry trade show, will be held at the Los Angeles Convention Center. More than 200 leading companies are expected to display and demonstrate new computer systems, peripherals, software, media and supplies, services, accessories and other related items. For further information contact The Interface Group, Inc., 300 First Avenue, Needham, Massachusetts 02194, (617)449-6600

APRIL 3-6, 1986
THE WEST COAST COMPUTER FAIRE is the longest running and largest computer user show in the nation. Located in San Francisco, the center of the computer industry. The 11th West Coast Computer Faire targets business, professional, and home users, as well as resellers and independent software developers. The latest in microcomputer hardware, software, peripherals and services will be showcased. A comprehensive conference program is included in the price of admission. For more information contact Computer Faire, Inc. (617) 965-8350

APRIL 6, 1986
1986 GREATER BALTIMORE HAMBOREE AND COMPUTERFEST will be held at the Maryland State Fairgrounds in Timonium, MD. This is the largest multi-interest personal comptuer, small business computer, electronics show, and flea market in the Mid-Atlantic area. The Computerfest will be open from 8am to 4pm. Admission is $4.00. For additional information contact; G B H & C, P.O. Box 95, Timonium, MD 21093-0095; (301) 561-1282

APRIL 6-10, 1986
1986 SPRING CONFERENCE - REACHING FOR EXCELLENCE will be held at the Sheraton Centre Hotel in New York, NY. Over 380 presentations are being planned, not only covering the various systems present within the membership, but management and application topics as well. The schedule is designed to provide attendees the latest "state of the art" information and techniques. Presenters are not only users but IBM technical personnel as well. For additional information contact COMMON, 435 N. Michigan Ave., Ste. 1717, Chicago, IL 60611; (312) 644-0828

April 7-10, 1986
ANNUAL CONVENTION AND TECHNOLOGY EXPOSITION, at Diplomat Hotel, Hollywood, Florida. This convention will feature four days of technical sessions of importance to design/drafting management. For additional information contact American Institute for Design and Drafting, 966 Hungerford Drive, Suite 10-B, Rockville, MD 20850; (301) 294-8712.

APRIL 12, 1986
NY-NY TIMARC will be hosted by the QB-99'ers User Group at Queensborough Community College, Bayside, NY. The conference will start at 1 pm and continue until 6pm. Tutorials on hardware and software development and maintenance will take place from 2 to 5pm. For additional information contact Mr. Frank Cotty, Queensborough Community College, 56th Ave. & Springfield Blvd., Bayside, NY 11364

APRIL 12 & 13
FORT WORTH COMPUTER SHOW, at Amaon G. Carter Exhibit Hall Crestline Road, between Montogomery & University Drive, 250 8" tables. For additional information contact Bob Norman, P.O. Box 9504, Ft. Worth, TX 76107

APRIL 15-17
ROBBERY WITHOUT A GUN--DETECTION, PREVENTION, PROTECTION, in Chicago, teaches and reviews effective audit techniques used in the detection, prevention and protection of internal and external data security. You will be equipped with a *Handbook of Guidelines*, techniques and procedures to combat against "Robbery Without A ¼Gun." For additional information contact T.J. Enterprises, P.O. Box 255, Chicago Ridge, IL 60415-0255; (312) 839-2611.

APRIL 16-17, 1986
THE 13TH ANNUAL NEBRASKA INFORMATION PROCESSING EXPO & CONFERENCE will be held at the Holiday Inn Convention Center in Omaha, Nebraska. For additional information contact Industrial Presentations West, Inc., 12371 East Cornell Avenue, Aurora, Colorado 80014

APRIL 26-27, 1986
COMMODORE ASSOCIATION OF THE SOUTHEAST, INC. ANNUAL MEETING will be held at the Opry Land Hotel in Nashville, TN. For additional information contact Commodore Association of the Southeast, Inc., P.O. Box 110386, Nashville, TN 37222

APRIL 27, 1986
COMPUTER CENTRAL SHOW will be held at the Holiday Inn in Itasca, IL. For additional information call (312) 940-7547

MAY

MAY 3-4, 1986
THE FIRST MIDWEST T/S COMPUTERFEST will be held at the Ramada Inn of Sharonville, Ohio (Cincinnati). On hand will be Aerco, E. Arthur Brown, G. Russell Electronics, Zebra, and many others (including myself). For more information contact Jack Roberts, 3832 Watterson, Cincinnati, OH; (513) 271-5575

MAY 11-14, 1986
1986 ANNUAL SYSTEMS CONFERENCE will be held in New Orleans. This conference is going to focus on what the world of information systems is going to be like in 2,000 A.D. The Conference's educational format will be bolstered by other noted speakers on a variety of information systems topics. Complete details on the 1986 Conference may be obtained by contacting Richard B. McCaffrey, ASM International, 24587 Bagley Road, Cleveland, OH 44138

MAY 14-16, 1986
THE 9TH ANNUAL ROCKY MOUNTAIN INFORMATION EXPO & CONFERENCE will be held at Currigan Hall, Denver, Colorado. For additional information contact Industrial Presentations West, Inc., 12371 East Cornell Avenue, Aurora, Colorado 80014; (303) 696-6100

MAY 24, 1986
THE ANNUAL HAMFEST & COMPUTER FEST will be held at lower level of South Square Mall in Durham, N.C. from 8:00 am to 4:00 pm. The flea market will be held under a covered parking deck. Talkin will be on 147.825/225. Admission will be $4.00 at gate. For further information contact D.F.M.A., P.O. Box 8651, Durham, NC 27707 or Mick W4ZUS at (919) 544-3556

May 29-31, 1986
PERSONAL COMPUTER INTERFACING WORKSHOP for Scientific Instrument Automation, from Virginia Tech; held in Blacksburg, Va.; directed by Mr. David E. Larsen and Dr. Paul E. Field. $495. 3 days. Hand-on workshops with each participant wiring and testing interfaces on the IBM-PC and other personal computers. Call or write Dr. Linda Leffel, C.E.C., Virginia Tech, Blacksburg, VA 24061, (703) 961-4848.

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SEPTEMBER

SEPTEMBER 18-19, 1986
COMDA/CANDAX, at Palais des Congres Montreal Convention Centre, Montreal, Canada. For additional information contact Candex Conferences Inc. 47 Lakeshore Road East, Mississauga, Ontario L5G 4L7; (416) 271-1601

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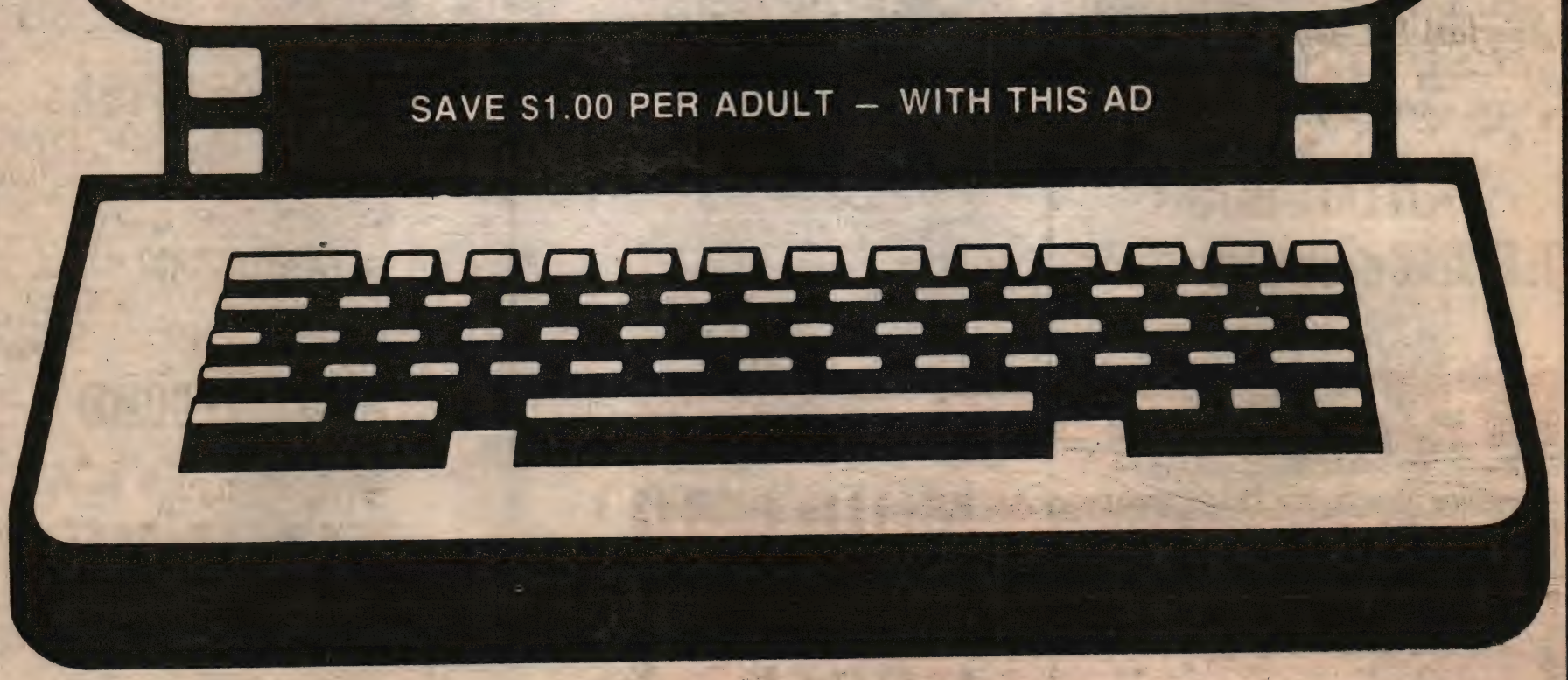
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Tandy Topics continued from page 64

A new memory board was obtained and produced the same results. Another copy of the software was brought, again nothing. In quick succession we changed the memory board, hard disk controller board and hard drive. Same results. By this time everyone concerned was convinced that the problem was my computer. That cuts close to the bone. By this time the "frantic" had turned to "ANGER!"

The memory board that I was using was Micro Mainframe's 4N1 and I turned to them for help. They could not have been nicer and they knew what the problem was and what's more important, how to cure it. They assured me that all was well with the hardware. The real bug was in the software.

A trip to Radio Shack for the Tandy hard drive utilities solved the problem. With the HD-FORMAT program the problem disappeared. Some of the software checks the memory differently than the Tandy software and therefore refuses to recognize the available memory. Unless I miss my guess this particular format utility was designed for PC-DOS and not MS-DOS.

I have a problem with suppliers that don't do their homework. However, fair is fair and I have to say that I have two hard drives from the same company and they are excellent drives after you get them running. One of them has been up and running on my Model 4 for three years without a hitch. If I have needed service it has been readily obtainable, through the dealer, from Software Support without question.

DOS Helper

Being new to MS-DOS I need all the help I can get. I was disgusted with the DOS "manual" that came with the Model 1000 and promptly went back and spent nearly $35 for the manual that should have been with the computer (now I have to do the same thing for the BASIC manual). Aristo Software's DOS HELPER has taken some of the pain out of the conversion to a new DOS. Installed either on floppy or hard disk DOS HELPER can be memory resident or run as a standard file.

Supplied on a non protected disk DOS HELPER has two versions of the program. One version is co-resident and is called up by using CTRL F5. The other is run from the DOS prompt by using "H" (ENTER). Once the program is up and running a menu of over 100 selections is presented. All DOS commands and DEBUG commands have help available.

The Main Features Menu lists 9 different areas of help available--Introduction; Content; Index, Commands (List), Commands (By name), Topic, Syntax, and Own (Create your own HELP files.) Just about any assistance you will need while using the DOS is available. Having the list of commands available on screen makes it easy to grow in your use of the operating system. It eliminates a lot of fumbling with the manual.

DOS HELPER can be installed on a one or two disk system or a fixed disk with the help of the on board install program. Nothing is left to chance as the program is set up with defaults for the more common set up. Changing the defaults is as easy as selecting A, B or C. Once the configuration is done you are ready to use DOS HELPER.

The program runs just as it should with no problems. The option to create your own help files offers some interesting possibilities for the tinkerer or serious operator that has other people using a system that he has set up for common usage. The documentation is 15 5½"x 8½" pages long. Since the program is so easy to run most people will need very little of the documentation in order to use DOS HELPER.

DOS HELPER for MS-DOS & PC-DOS
$29 (+ $3 S&H)
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The Maynard Mouse

I have turned up my nose at mice for computers for some time as I couldn't find any "real" use for them. Translate that to read that I couldn't use one on my Model 4 so the heck with them all! Things change as time goes on and now a Model 1000 graces my office at home. Maybe I should look at these mice a little more.

The Maynard Mouse comes complete with its own card, software and manual. Also included is the Telepaint program by LCS/Telegraphics. According to the manual everything is included except for cheese, water and cage which they suggest be obtained locally. The inclusion of the Telepaint program makes this an even more attractive package.

Installation of the mouse is as simple as adding a card to your computer. For the Model 1000 it required bending a flange on the face plate of the card as it was about 1/2"too long. Maynard is putting a serial mouse on the market this month that will not require its own card. If you have the slot available no problem, if not use the serial mouse when it is available. After plugging in the mouse you are ready for the software. Use the screws in the connector to keep the plug in place. It will work loose if left unfastened and the mouse will "get away."

Make a copy of the software and file the original. The disk is not copy protected. Assuming that the application you are using is one of those that is mouse compatible all you have to do is type MOUSE and then start your application. The MOUSE is now ready to run around and do its thing.

If your application is not mouse compatible you can make it that way by using the CustomKey feature to tailor the MOUSE functions to the program. If a program is usable on many of the compatibles it is most likely compatible with CustomKey.

continued on page 208

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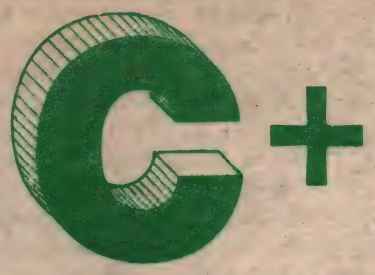
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asm	conc	ferror	getdseg	iscntrl	open	repmem	strcmp
asmx	cos	fflush	getd	isdigit	outp	rewind	strcpy
atan	cpystr	fgets	putd	islower	peek	right$	strlen
atof	creat	fileno	getdate	isprint	perror	rindex	strncat
atoi	cursblk	filetrap	gettime	ispunct	poke	rmdir	strncmp
atol	curslin	find	geti	isspace	poscurs	scanf	strncpy
bdos	curscol	floor	puti	isupper	pow	setbuf	strsave
bdosx	cursrow	fopen	getkey	itoa	printf	setbufsiz	system
bios	cursoff	fprintf	getmode	keypress	putc	setcolor	tolower
biosx	curson	fputs	setmode	left$	putchar	setdate	toupper
calloc	delete	fread	gets	len	puts	settime	ungetc
ceil	drand	free	getw	log	putw	setjmp	ungetch
cfree	exec	freopen	heapsiz	log10	rand	setmem	unlink
chain	execl	fscanf	heaptrap	longjmp	read	sin	write
character	execv	fseek	hypot	lseek	readattr	sound	writechs
chdir	exit	ftell	index	malloc	reach	sprintf	xmembeg
chmod	exitmsg	fwrite	inp	alloc	writech	sqrt	xmemend
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Tandy Topics
continued from page 206

Made of programmable menus CustomKey gives you the ability to: change the function of the mouse buttons to fit keystrokes needed in your application; add up to 16 more commands in addition to the 6 already programmed for the mouse; and change the menus and mouse to suit your needs.

The first step is to create a macro key file for your application. By typing CUSTOM filename <ENTER> (filename is any 8 letters you choose) with the mouse software working copy in drive A you will have an empty CUSTOMKEY macro file loaded. At this point you load and run your application. The mouse will be active and the CustomKey menu can be called up by pressing all three buttons.

Enter functions for the mouse buttons and various macros you want to be executed by CustomKey. There is a capability of up to 16 macros. These can be entered keystroke by keystroke or you can instruct the program to "learn" and then carry out the operation. CustomKey will remember what keystrokes you used and make them part of the file. These macros can be changed, edited, deleted as needed or more can be added if necessary.

Mouse operation and button functions can also be changed as needed. From the main CustomKey Menu select Button Function Menus. You will be presented with the option of changing or deleting button functions. The three buttons have the capabilities of these settings:

D U U
U D U
U U D
D D U
U D D
D U D

Each of these can be assigned a macro which can later be edited, deleted or changed completely as needed.

The Mouse settings that can be changed are listed on a separate menu. They are the functions that deal with the operation of the mouse itself. I like the option to change it from right to left handed. The buttons can be made to click as they are pushed. Dynamic scaling (the faster you move the farther the cursor moves. Yes, farther) and the confirmation line ("do you really want to...?") can be toggled off and on. Horizontal and vertical cursor speed can be altered as well as setting the button and repeat delay. These are mostly little features...little features that mean a lot to many folks.

The manual does an excellent job of explaining the process of customizing the mouse to your application. Since this process is menu driven it isn't hard to handle at all. Reading the manual is an education. The possibilities for use of the mouse surprised me to say the least. Besides the applications that already support the mouse usage I find many more that I will enjoy setting up as I go along.

The Advanced Features of CustomKey section of the manual deals with setting up a CUSTOM.BAT file that contains everything needed to start CUSTOMKEY, the Mouse and your particular application. The various files needed are explained and the various parameters needed for each are shown. This section is mostly for those that are very serious or those like me that like to play (active learning if my wife asks).

If your Mouse gets a headache, before you take it to the doctor run the Mouse test program as a diagnostic. This gives you a chance to check the movement, functions and technical information. Might save a repair bill. Maynard has included a section of the manual dealing with various messages that might be displayed at one point or another. Each one is explained as to what it means, why it has occurred and what to do about it.

Maynard has done a fine job on the Mouse and an exceptional job on the documentation. There is just enough "humor"interjected to keep it from becoming a chore. The material is direct, to the point and presented in such a way that anyone can set up the mouse and grow into the advanced applications. The author(s) of the manual deserve an award for some beautiful work!

The only drawback I found was the necessity of using a card slot for just the mouse instead of a serial port. The 1000 doesn't have that many slots to play with from the start. Maynard has solved that with the new serial mouse that should get on the market this month. If you have a Model 1000 be prepared to bend the cover plate on the mouse board a little but that is no big thing.

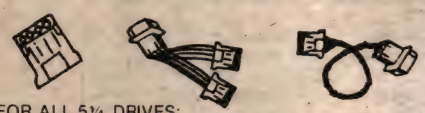
Maynard calls their mouse "The Intelligent Mouse," I prefer SUPERMOUSE!

continued to page 209

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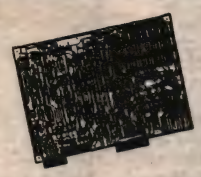
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Tandy Topics continued from page 208

The Maynard Mouse, $185.00, Serial version $215, Maynard Electronics, 460 Semoran, Casselberry, FL 32707, (305)331-6402.

Turbo Lightning An On Line Information System

"TURBO LIGHTNING is an interactive look-up system that gives you fast, keytouch access to the complete 83,000 word Random House Thesaurus." This is the opening sentence in the documentation for Borland International's offering TURBO LIGHTNING. I don't mind telling you that it sounded a little grand to me when I first read the text. As documentation goes this text is a little overwhelming at first until you see what the authors must have had in mind. A lot of the documentation is not necessary at first and may never be used by some that aren't interested in the technical aspect of how the program works. It's there if you want to read it and if not, skip it. There are about twenty pages that you will use as a reference after the program is installed. The rest of the documentation will be used on those occasions when you have time to browse or a need to customize the program to a particular application.

Supplied on three disks, TURBO LIGHTNING is not copy protected. The first two disks are used for floppy operation and the third for hard disk. Installation is not hard. I have set up the program on a Tandy Model 1000 and a Leading Edge Model D with no problems. Both require the ANSI driver to be installed. Add ANSI.SYS to your configuration file before you try to install TURBO LIGHTNING. Working with copies of the original disks place the Systems Disk in A and the Install/Supplemental Disk in B. Type <LIGHT> <ENTER> and the program loads into RAM. This method of using the program is best unless you are running a hard disk or set it up on a RAM disk that acts like a hard disk.

Once the program is in RAM, <SHIFT> <F8> calls up the main menu by using a window at the top of the screen. ENVIRONMENT, WORD-CHECK, FULL-SCREEN-CHECK, THESAURUS, SETUP and OPTIONS are the selections offered from the menu. The OPTIONS selection produces a second menu that allows you to toggle the "Auto proof" and the "Confirm Window." From this same menu you are able to rededicate the "HOT KEYS" in case one or more of them is needed by some application you are running. <SHIFT F8>, <ALT F10>, <ALT F9>, <ALT F8>, <ALT F7>, <ALT F6> and <ALT F5> are used as the program comes from Borland. Changing them is as easy as typing the desired replacement and hitting ENTER. These HOT KEYS activate parts of the program like the Main Menu, Thesaurus, Auto Proofing and other items you will need to use.

The SET-UP option from the MAIN MENU lets you select which dictionary and thesaurus file you will be using. There are 5 dictionary files and 2 Thesaurus files included with the package that are used for different set ups. One set is for hard disk, one for RAM drive and several dictionary files for floppy depending on disk space available. The Auxiliary dictionary file is one that is empty so you can add words that aren't in the dictionary you are using but are required for your particular usage. This file grows as you use TURBO LIGHTNING.

The Thesaurus selection is just what it appears to be, a call to find synonyms for the word at the cursor. These are displayed in a window and you can replace the indicated word with a synonym by selecting it from the list and typing the letter of the selection. Using the word "computer" produced a list of data processor, CPU, mainframe, minicomputer, chip, microcomputer and calculator.

WORD-CHECK and FULL-SCREEN-CHECK

continued to page 210

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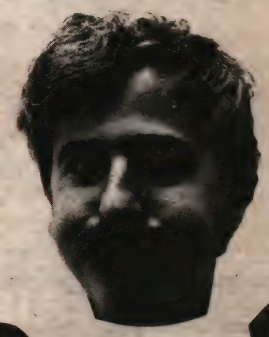
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continued from page 191

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*OAP (Office and Agent Productivity)
Sales information package. Maintains records of all inhouse listings and sales. Provides information on

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Tandy Topics
continued from page 209

both refer to spelling checks with the dictionary. WordCheck uses only the word at the cursor and Full-Screen-Check checks every thing on the screen. Checking the spelling of "COMPUTER" produced a screen of "Sound alike words" in a window. The first was "COMPUTER" which was what the word should have been in the first place. Striking the "A" key produced an instant replacement on the screen...COMPUTR was replaced with COMPUTER. The rest of the words were close to the original. A Full Screen Check produces a highlight for each word that does not match up with the dictionary. At the end of the check you can go through and have each one corrected.

Selecting ENVIRONMENT from the main menu produces a list of applications that you might be working in and shows which one is active. Listed are Wordstar, Multimate, PFS Write, Microsoft Word, Display Write, Word Perfect, Volkswriter Deluxe, Sidekick, Lotus 123, Modem Communications, Turbo Pascal and Reflex. You have to indicate which environment you are working in each time except for DOS and Sidekick. These two TURBO LIGHTNING senses and sets up automatically. If your applications aren't listed the documentation explains how to set up an environment setting to suit your needs.

By far the most interesting part of TURBO LIGHTNING is the AUTO PROOF feature that checks each word — *as you type it*. If there is an error the program "Beeps" at you to let you know that there is a proble. This feature can be toggled on or off as you desire. A lot of my errors are careless errors that I would correct immediately if I was conscious that they had occurred. Some times this feature would be a royal pain in the back side if it couldn't be turned off. Like right now. A beep would slow me down terribly as I write. However, typing a letter or paper the beep would help me most of the time.

There is more to the program but it isn't needed until you have to custom design an environment. At that point it is mostly a matter of following the selections from a menu.

This is an unusual way to check spelling for me. I am accustomed to finishing the document and running a dictionary program from within my word processor. Both ways of checking spelling have their merits. A lot depends on how you trained yourself and what programs you used. The Thesaurus I like better than what I have been using with no time needed for it to grow on me. I find that I could get used to Borland's TURBO LIGHTNING very quickly.

I could find no faults with the program. It is all they claim and then some. In the first sentence of this review I said I thought it sounded a little "grand." In actuality I think they understated the merits of TURBO LIGHTNING. The documentation is well written and certainly covers all you need to know. Compared to msot other dictionary and thesaurus programs I've used it is a real jewel.

TURBO LIGHTNING, $99.95, Borland International, Inc., 4585 Scotts Valley Drive, Scotts Valley, CA 95066. ●

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Real Estate
continued from page 210

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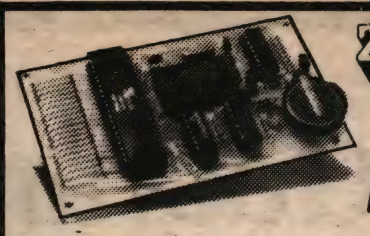
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continued on page 213



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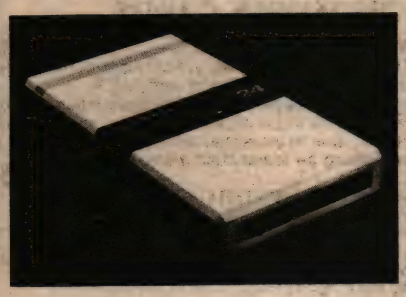
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Vivitar Transtar 140 (F-10/40) serial printer with 40 CPS letter quality print speed. Has all the above features plus! Great printer, great price!!

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TRANSTAR 130
Vivitar Transtar 130 (serial or parallel) printer with 20 CPS letter quality print speed. Compatible with all major word processing packages. Features proportional spacing, bidirectional printing, boldface and underscore. PLUS, auto paper loading.

GREAT PRICE: $249.95

COMMODORE 6400
This daisy wheel printer has 40 CPS letter quality print speed (F-10/40). Features parallel centronics interface. This is a SUPER printer.

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NEC PC-8027A
This NEC printer weighs only 13 pounds and is designed with a convenient handle to make it the perfect companion for your portable computer. With draft print speed of 105 CPS and its parallel centronics interface, this dot matrix printer is a super deal at this low price.

NOW JUST: $149.00

DIABLO P38
This printer is built for pure speed in data processing. At 400 CPS and a full 132-column width this printer will meet the centronics/parallel interface. Includes tractor feeder and accoustical foam packing for silent printing.

ONLY: $789.00

NEC-PC PR103A
This printer is defined as a tri-mode printer. Not only will the PR103A do first drafts with dot matrix speed (110 CPS), but also will print near letter quality at 46 CPS and do graphics print outs in the dot-image mode. Price includes tractor feeder.

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Real Estate
continued from page 211

Timeshare resort management including reservation, owner billing and escrow tracking. Tracks escrow closing dates and deposits. Displays all units available for sale.
IBM PC, XT, AT - 192 KB req. - Sample diskettes avail. - Copies sold: 10 since 1983 - Cost: $5,000-$6,000

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303-333-6505
*UNITKEEPER
Short term condominium and hotel/resort rental accounting system. Handles reservations, availabilities by rotation, arrivals and departures, bank reconciliation, confirmation letters, travel agent checks and reports, maid scheduling and unit activity. Includes night audit, mailing labels, cash drawer audit, owner profit/loss, marketing reports, AP, AR, GL and payroll.
IBM PC, ST - 64 KB req. - Sample diskettes avail. - Copies sold: 50 since 1978 - Cost: $3,300 an up.

SAGE RESEARCH CORP.
408-241-5600
*PMANG (Property Management)
Real estate and property management program. Prepares monthly owners report. Maintains full trust fund accounting.
IBM PC - 48 KB req. - Sample diskettes avail. - Copies sold: 100 since 1981 - Cost: $195

SDC FINANCIAL SERVICES, INC.
619-264-6365;800-223-9248
*PROFITLINE
Maintains tenant-by tenant, debt and equity placement cash flow forecasting on major real estate projects. Handles hundreds of tenants per project, variable overall CPI's, multiple market rent adjustments, step-up-leases, fixed rents, non CPI rates, re-leasing expenses, variable vacancy rates, CPI's with ceilings, mid year adjustments, credit tenancy vacancy exemptions, porters wage escalations, complicated expense pass throughs, percentage rates, and up to 500 expenses categories. Accommodates fixed rate, participating, bowtie, and landsale/leaseback loans; loans with equity; joint venture; and all cash and leveraged acquisitions and sales.
IBM PC - 64 KB req. - Copies sold: 250 since 1982 - Cost: $1,575

SHLAES & YOUNG INFORMATION SYSTEMS, INC.
312-645-0808; 800-621-1086
*microREAM
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IBM PC - 256 KB req. Copies sold: 30 since 1984 - Cost: $2,950-$3,450

SIMPLE SOFT, INC.
312-944-7995
*Quikcalc Real Estate Investor
Real estate analysis package that requires VisiCalc of SuperCalc. Allows user to evaluate potential real estate sales or purchases. Tow models are included for individual residences or income properties.
IBM PC - 128 KB req. - Copies sold: 5,000 since 1982 - Cost: $129
*Simple Soft Real Estate Investor II, a Sof.Plate
Template enhancement for Lotus 1-2-3 to provide teal estate transaction analysis. displays information on a worksheet format with entry and output segregated so multiple assumptions can be entered and results evaluated. Commands are macro-driven in menu format, and include SimpleGraph option for marketing presentations and graphic analysis.
IBM PC, XT, AT - 256 KB req. - Sample diskettes avail. - Copies sold: 500 since 1985 - Cost: $149

SOFSTAR, INC.
305-848-7054
*VisiCalc Real Estate Templates
Real estate investment analysis system structures VisiCalc from a blank spreadsheet to preformatted screens. Handles amortizations, personal financial statements, ACRS depreciation, income property investment analysis, comparative depreciation, internal rate of return and mortgage loan analysis.
IBM PC - 64 KB req. - Copies sold: 8,000 since 1981 - Cost: $150

THE SOFT ESTATE
312-259-6301
*Real Estate Investment Analysis Customizing Kit
Provides analyses of real estate investments. Standalone program that analyzes buy/hold/sell decisions. What-ifs on loans, depreciation, taxes, inflation rates and other factors can be changed to uncover possible investment pitfalls.
IBM PC - 64 KB req. - Copies sold: 800 since 1982 - Cost: $65-$915

THE SOFTA GROUP, INC.
*Skyline: The Property Management System
Vertical market package for commercial/residential property management. Assists in tracking and controlling rents, deposits, payments, vacancies, lease escalations and expirations, pass-throughs, occupant histories, and other management information. Features windowing and an on-line calculator.

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Special User Group Announcement

The User Groups listings are partially omitted from this issue because of the inclusion of the special section "Spotlight on Real Estate."



NEW PRODUCTS!

U.P.S.
Uninterruptable Power System
200 Watt continuous.
Battery included.
System complete.
$259.50

HFCA CARD $285.00
Hard Disk/Floppy Disk Controller Card for PC AT or compatible system. One card can control two floppy drives. 320K or 1.2 Meg. Accepts either format. Switch between formats automatically by SW detection. Controls 2 hard disks with up to 16 heads & 1, 024 cylinders.

SEGA CARD $360.50
Enhanced graphic adaptor. Fully compatible with IBM EGA. 256K ram screen buffer. Emulator standard IBM color graphic adaptor and monochrome display adaptor. Will co-exist with GCA or MDA in the same system. 640 X 30 resolution with 16 colors in each pixed AT EGA mode. Printer port addressable 1, 2, 3.

CPU MOTHER BOARD $160.00
Made like an add-on card. Can run all IBM type software. When used in conjunction with MFP Card, CGG Card, Floppy Controller and Hard Disc Controller and Expansion Master Chassis makes a complete computer with 640K memory, floppy disc, 20M hard drive. Only 12" wide, 15" long and 6" high. Excellent where size is important and in industrial applications can be rack mounted.

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THE BEST HAYES COMPATIBLE
MODEM WITH THE MOST RELIABLE QUALITY
- 0-300, 1200 bps, Bell 103, 212A
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- Status indicators
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5 Expansion slots
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Front Panel Selector Knob provides convenient control of Multi-Display Function 14" Full Color, Green or Amber
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XT or AT Compatible

IBM COMPATIBLE



Type 5050
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Many Formats - All commonly used floppy disk formats are contained in the internal ROM software. The machine duplicates disks automatically analyzing their formats track-by-track. Due to increased sales we have received a price reduction that we are passing on to our customers.

CGG CARD $85.00
(COLOR GRAPHICS/MONOCHROME/PRINTER CARD)
- TTL/Composite level outputs
- 40 x 25 low resolution or 80 x 25 high resolution
- 16 foreground and 8 background colors
- 16K bytes display memory
- 320 x 200 (color) and 640 x 200 (B/W) resolutions in APA mode
- Centronics printer port
- Printer port address selectable (LPT1/LPT2)
- Light pen
- Monochrome (8 x 8 character box) on monochrome (TTL) monitor

MONOCHROME CARD $56.50
MONOCHROME GRAPHICS $83.50
(Hercules Compatible) and Printer Card
MFP CARD $99.50
(384-PLUS MULTI FUNCTIONS CARD)
- Up to 640K RAM on board
- Parallel printer
- Clock/calendar
- Serial port (optional 2nd serial available)
- Spooler

FLOPPY DISK $36.00
4 Drive w/Cable
384 MULTIFUNCTION $87.50
Card w/Clock
IOF CARD $99.00
(MULTI-I/O CARD)
- One EIA-RS232C port (Sockets for optional 2nd EIA-RS232C port)
- One Centronics parallel printer port
- Clock/calendar
- Set/retrieve clock program
- Game port
- Controls 2 half height 5-1/4" DSDD floppy disk drives

PRINTER CARD $27.50
COLOR GRAPHICS CARD $71.50
SUPER XT 16 MOTHERBOARD $149.00
w/0K Ram
PC 90 Super XT16 motherboard $135.00
Capability of 640K on board (RAM extra)
PC 92 X Turbo Motherboard $165.00
Capable of 6.77 Mhz operation, potential of 640K on board (RAM extra)
POWER STRIP $12.50

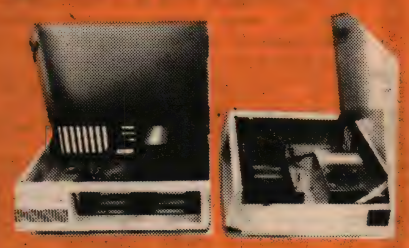
AT STUFF

Power Supply $142.50
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We understand power good problems, our parts meet the specs.
AT Compatible Case ..... $ 89.50
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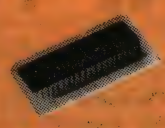


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ATARI USERS GROUP, 3262 AIRPORT BLVD., MOBILE, AL 36606. 205-478-1282
BAMA 99'ERS, P.O. BOX 1307. TUSCALOOSA, AL 35403
BAY AREA IBM PC USERS GROUP C/O STEVE HUGHES, RT. 2. BOX 281-B. FAIRHOPE, AL 36532
BIRMINGHAM APPLE CORPS, PO BOX 55421. BIRMINGHAM, AL 35255
BIRMINGHAM USER GROUP, RT. 1. BOX 539-E. TRUSSVILLE, AL 35173
C.A.T.I. 99/4A UG 4530 NARROW LANE ROAD. MONTGOMERY, AL 36116 205-288-3698
CENTRAL ALABAMA MICROCOMPUTER SOCIETY, C/O LEWIS E. GARRISON. SECRETARY. 6375 PINEBROOK DR., MONTGOMERY, AL 36117
COMPUPALS USA FRIENDSHIP NETWORK & INTERNATIONAL USERS GROUP, C/O T.A. LYNCH. 737 MARYETHEL DRIVE. MONTGOMERY, AL 36109
CP/M USERS GROUP OF BIRMINGHAM, PO BOX 4412. BIRMINGHAM, AL 35206
FRANKLIN/APPLE USERS GROUP, 3262 AIRPORT BLVD., MOBILE, AL 36606
G2C3, SPRING HILL COL., MOBILE, AL 36608
GREATER GULF COAST COMPUTER CLUB SPRING HILL COLLEGE, MOBILE, AL 36608
HUNTSVILLE ALABAMA COMMODORE KOMPUTER SOCIETY (HACKS), P.O. BOX 14356. HUNTSVILLE, AL 35815
HUNTSVILLE ATARI USERS GROUP C/O HAROLD BLEVINS. 514 JEFFREY DRIVE. N.W., HUNTSVILLE, AL 35806
M.O.C.U.G., MOBILE COMMODORE USER GROUP, 3262 AIRPORT RD., MOBILE, AL 36606
MOBILE HEATH USERS GROUP, C/O Bob Small. 354 Teakwood Dr., Setsuma, AL 675-9742
MOHUG USERS GROUP, 3636 LINDEN LANE. MOBILE, AL 36608
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SHOALS 99ers, PO BOX 2928. MUSCLE SHOALS, AL 35662
SOFTWARE SOURCE, 3262 SPRINGDALE MALL. MOBILE, AL 36606
SOUTH ALABAMA USERS GROUP (SAPPLE), PO BOX 8894. MOBILE, AL 36608-0894
SOUTH, MOBILE AND ALABAMA USERS GROUP TI-99 (S.M.A.U.G.), RT. 2 BOX 169-B. GRAND BAY, AL 36541
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SHARP YX-3200 GROUP, C/O JOHN MORRISON. 801 AIRPORT HTS., SPACE 186. ANCHORAGE, AK 99508

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J.U.G., JACKSONVILLE TI 99/4A USERS GROUP, P.O. BOX 525. JACKSONVILLE, AR 72076
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68796 (6800 ' IEEE-796) HACKERS/NEWSLETTER, 12450 SKYLINE BLVD., WOODSIDE, CA 94062
99er's UG ASSOCIATION, 3535 SO. H. ST., #93. BAKERSFIELD, CA 93304
ABACUS - A BAKERSFIELD AREA COMMODORE USERS SOCIETY, C/O GENE SMITH. 2316 SANDY LANE. BAKERSFIELD, CA 93306
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INSUA, P.O. BOX 2910. FAIRFIELD, CA
INTECOLOR-COMPUCOLOR UG, 5250 VAN NUYS BLVD., VAN NAYS, CA 91401
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INTERNATIONAL HOME COMPUTER USERS ASSOCIATION, P.O. BOX 371, RANCHO SANTA FE, CA 92067
JPL APPLE COMPUTER CLUB, 4800 OAK GROVE DRIVE. PASADENA, CA 91103
KAYPRO UG, 3134 N. PALM SHIELDS, FRESNO, CA 93704
KINGS 99/4A UG, 299 W. BIRCH, HANFORD, CA 93230
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LA 99ers COMP. GROUP, P.O. BOX 3547. GARDENA, CA 90247
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LOGIGIC CLUB, 550 MARIGOLD DR., FAIRFIELD, CA 94533
LOS ANGELES COLOR COMPUTER UG, C/O CRAIG R. HANNA. 10144 DAINES DR., TEMPLE CITY, CA 91780
LOS ANGELES CROMEMCO, 4747 SUNSET BLVD., LOS ANGELES, CA 90027
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MACVALLEY USERS GROUP, P.O. BOX 4297. BURBANK, CA 91503
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MODE, SAN LORENZO VALLEY HIGH SCHOOL. FELTON, CA 95018
MODESTO - TURLOCK IBM PC UG, P.O. BOX 1122. MODESTO, CA 95353
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NORTHERN CALIFORNIA COMPUCOLOR UG, 5670 ALLEN AVE., #2. SAN JOSE, CA 95123
NORTHSTAR SOFTWARE EXCHANGE, 704 SOLANO AVE., ALBANY, CA 94706
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AA—Auto Answer
SP—Built-in Speaker
IC—Includes cable
IS—Includes Software
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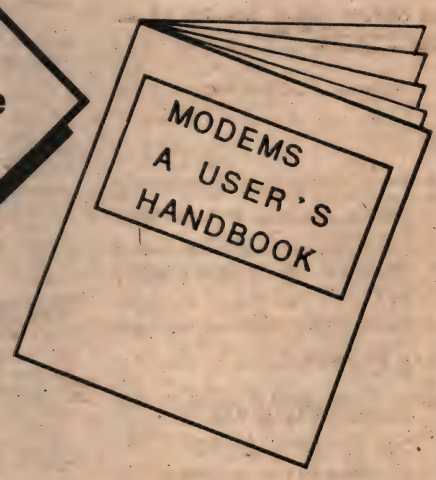
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CENTRAL IOWA 99/4A USERS GROUP, P.O. BOX 3043. DES MOINES. IO 50316
COMMODORE COMPUTER USERS GROUP OF IOWA, P.O. BOX 3140. DES MOINES. IA 50316
COMMODORE USERS GROUP OF CLINTON, BOX 743. CLINTON. IA 52732
COMPUTER USERS CLUB, 1101 S. 2ND AVE.. MARSHALLTOWN. IA 50158
FT. MADISON COMPUTER CLUB, c/O JAMES LAIR. R.R. #1. BOX 390. FORT MADISON. IOWA 52627
GREEN ACRES COMPUTER CLUB, RR3. BOX 126. AFTON. IA 50830
THE GREEN APPLES, BOX 622. CEDAR FALLS. IA 50613
HAEKATARI, 2564 22ND AVE.. MARION. IA 53202. ATTN: JOHN WIESE
HAWKEYE - PC, IBM PC USERS GROUP. 385 COLLINS RD. N.E. SUITE 201. CEDAR RAPIDS. IA 52404
IOWA CITY TRS-80 USERS GROUP, C/O JOHN GREEN. P.O. BOX 1494. IOWA CITY. IA 52244
IOWA USER GROUP, 844 10 ST. N.E.. MASON CITY. IA 50401
MIDWEST ATARI GROUP, IOWA CHAPTER (MAGIC). 1125 3RD ST.. NEVADA. IA 50201
NORTHEAST IOWA HOME COMPUTER USERS GROUP (N.I.H.U.G.), 804 OLIVE STREET. CEDAR FALLS. IO 50613
QUAD CITY COMPUTER CLUB, BOX 3994. DAVENPORT. IA 52808
TEXAS INSTRUMENT USERS GROUP, BERNARD Y. TAO. DEPT. OF CHEMICAL ENGINEERING. IOWA STATE UNIVERSITY. AMES. IA 50011. (515) 294-1784
WATERLOO AREA COMMODORE CLUB, PRESIDENT (RICK) FRED VOLKER. 945 LOWELL. WATERLOO. IA 50702: 319-232-1062

KANSAS

APPLE BITS, P.O. BOX 368. MISSION. KS 66201
THE C USERS' GROUP (INTERNATIONAL), P.O. BOX 97. MCPHERSON. KS 67460 (316) 241-1065
COMMODORE USERS GROUP OF WICHITA, ROUTE 1. BOX 115. VIOLA. KS 67149
INTEREST GROUP, 5522 EAST HARRY. WICHITA. KS 67218
KANSAS CITY METRO USER'S GROUP, 7010 CAENEN AVENUE. SHAWNEE. KS 66216
MID/AMERICA 99 USERS GROUP, PO BOX 2505. SHAWNEE. KS 66201
THE PLANE APPLE CLUB, PO BOX 47396. WICHITA. KS 67201
SANYO*WICHITA (SANWICH), P.O. BOX 621. DERBY. KS 67037: (316) 682-7998
WICHITA APPLE CLUB, P.O. BOX 4587. WICHITA. KS 67204-0587
WICHITA ATARI COMPUTER ENTHUSIASTS (WACE), C/O ED BOWLES. 4001 CESSNA DR.. WICHITA. KS 67210

KENTUCKY

APPLE SIDERS OF CINCINNATI, C/O GARY JOHNSTON. PRESIDENT. 27 CRYSTAL LAKE DR.. COVINGTON. KY 41017
ATARI EXCHANGE OF LOUISVILLE, P.O. BOX 34183. LOUISVILLE. KY 40223
BLUEGRASS 99/4 COMPUTER SOCIETY, P.O. BOX 11866. LEXINGTON. KY 40578-1866
BULLION APPLE CORPS., C/O TOM HOLDER. 7537-B McCRACKEN ST.. FORT KNOX. KY 40121
C*BUG THE COMMODORE BARDSTWON USER GROUP. PO BOX 165. BARDSTOWN. KY 40004. 502-348-6380
COLOR COMPUTER OF LEXINGTON, C/O SCOTT SEHLHORST. 3401 TISDALE DR.. LEXINGTON. KY 40503
THE COMMODORE CONNECTION, C/O JIM KEMP. 1010 S. ELM. HENDERSON. KY 42420
COMMODORE USER'S GROUP OF CENTRAL KENTUCKY, c/o LARRY OWENS. 115 SUMMERTREE DR.. NICHOLASVILLE. KY 40356
COMMODORE USERS GROUP OF MADISONVILLE (C.U.G.O.M.), C/O RICHARD BYRD. P.O. BOX 849. MADISONVILLE. KY 42431
KENTUCKIANA 99/4 COMPUTER SOCIETY, P.O. BOX 36246. LOUISVILLE. KY 40222
KENTUCKY AREA SANYO SOCIETY, RT #1. BOX 859. LEWISPORT. KY 42351
KENTUCKY OSBORNE GROUP, C/O JOHN WARNER, PRES.. 219 BURNAM CT.. RICHMOND. KY 40475
KIPCUG, PO BOX 3564. LOUISVILLE. KY 40201. PRES.. ROBERT D. HASTINGS (502)589-0254
L.A.U.G.H. LOUISVILLE APPLE USERS GROUP. INC.. P.O. BOX 6476. LOUISVILLE. KY 40207-0476
L.U.C.K.Y. (LOUISVILLE USERS OF COMMODORE IN KENTUCKY), C/O DAVE BOROUGHS. PO BOX 22244. LOUSIVILLE. KY 40222
OHIO VALLEY IBM PC USERS GROUP, 830 PARKWAY DRIVE. OWENSBORO. KY 42301
OK-SANYO, 2395 S. MAIN STREET. HIGHLAND HEIGHTS. KY 41076
OWENSBORO MICRO COMPUTER CLUB, 1805 PARRISH AVE.. OWENSBORO. KY 42301
PORTSMOUTH T/S USERS GROUP, C/O JOHN MARION. HC 63 BOX 650. GREENUP. KY 41144 (606)473-6791
RICHMOND MICROCOMPUTER USERS GROUP, C/O ERIC CALKIN. 302 MARTIN DRIVE. RICHMOND. KY 40475

LOUISIANA

ATARI PROGRAM ENTHUSIASTS OF SLIDELL, 117 DRURY LN.. SLIDELL. LA 70460. 504-649-6586
B.R.A.G., BATON ROUGE ATARI GROUP. 1955 DALLAS DR.. BATON ROUGE. LA 70806
BATON ROUGE COMPUTER CLUB, PO BOX 80648. BATON ROUGE. LA 70898-0648
BATON ROUGE PC USERS GROUP, C/O TOMWICHSER. 3375 KING BRADFORD. BATON ROUGE. LA 70816
BAYOU 99 USERS GROUP, PO BOX 921. LAKE CHARLES. LA 70602
CLUB MAC OF NEW ORLEANS, C/O SIMON L. STREIFFER. 111 ATHERTON DR.. METAIRIE. LA 70005 504-831-8275
COMMODORE PET USERS GROUP, WAYNE LOWDRY. PRES. 5064 BOWDEN ST.. MARRERO. LA 70072
GREATER NEW ORLEANS PCjr USERS GROUP, C/O PAUL RAHFIELD. 1829 STALL DRIVE. HARVEY. LA 70058
INTERNATIONAL APPLE CORE, PO BOX 976. DALY CITY. LA 94017
KAYPRO USERS GROUP OF NEW ORLEANS (KUGNO), 3724 OLE MISS DRIVE. KENNER. LA 70065
LA TRS-80 USERS GROUP, PO DDRAWER 627. MONTEGUT. LA 70377
MEGA CITY 1, PO BOX 187. JACKSON. LA 70748
N.E.L.A.C., NORTHEAST LOUISIANA APPLE CLUB, C/O DR. HARPER GAUSHELL. PRES.. ROOM 280. STRAUSS HALL. NORTHEAST LOUISIANA UNIVERSITY. MONROE. LA 71209
T.A.W.U.G., C/O JIM WILLIS. 1300 HINTON ST.. WEST MONROE. LA 71291
WBUG (WEST BANK USERS GROUP). P.O. BOX 740854. NEW ORLEANS. LA 70174-0804

MAINE

99/4A USER GROUP OF SOUTHERN MAINE, ATT: JOHN LEEKE. RR1 BOX 847. SANFORD. ME 04073
ACE, MAPLETON ELEMENTARY SCHOOL. MAPLETON. ME 04757
APPLE-USERS IN MAINE SCHOOLS, C/O RALPH GRANGER. UNIV. OF MAINE. FARMINGTON. ME 04938
COLOR COMPUTER MAGAZINE, HIGHLAND MILL. CAMDEN. ME 04843
DOWN EAST 99ers, C/O MARK RIDEOUT. P.O. BOX 542. WESTBROOK. ME 04092 (207) 797-2104
SO. ME. 64, C/O ED MOORE. 9 LYNDA ROAD. PORTLAND. ME 04103
PENOBSCOT VALLEY COMPUTER SOCIETY, 18 ELIZABETH AVE.. BANGOR. ME 04401
SOUTHERN MAINE TRS-80 USERS GROUP, 82 WELLINGTON ROAD. PORTLAND. ME 04103
TRANET, PO BOX 567. RANGELEY. ME 04970

MARYLAND

ANNAPOLIS CHAMELEON USERS GROUP (CHUG), C/O HAL VAN ALLER. 1285 GRAFF CT #2B. ANNAPOLIS. MD 21403
ANN-APPLE USERS GROUP, 266 HILLSMERE DRIVE. ANNAPOLIS. MD 21403. ATTN: WAYNE MECKLING. (301) 263-4053
ASSN. OF PERSONAL COMPUTER USERS, 3602 SANDY COURT. KENSINGTON. MD 20895
ATARI USERS, P.O. BOX 7761. SILVER SPRING. MD 20907
BALTIMORE APPLE USERS GROUP, PO BOX 13522. BALTIMORE. MARYLAND 21203
BALTIMORE COMMODORE USERS GROUP, 3121 ABEL AVENUE. BALTIMORE. MD 21218. ATTN: PAUL MOSCITT.
BALTIMORE SANYO USERS GROUP, C/O MARK KURZMACK. 809 W. BARRE. BALTIMORE. MD 21230
B.C.C. BETHESDA CHEVY CHASE ATARI USER GROUP, C/O ANDREW DILLER. 3316 SHEPHERD ST.. CHEVY CHASE. MD 20815
THE BOYDS CONNECTION, 21000 CLARKSBURG. RD.. BOYDS. MD 20841
CAPITOL AREA TIMEX/SINCLAIR USERS GROUP, C/O JULES GESANG. PO BOX 725. BLADENSBURG. MARYLAND 20710
CARROLL BITS USERS GROUP, C/O JOHN P. SANDS. 4401 LONDON BRIDGE RD.. SYKESVILLE. MARYLAND 21784
CHESAPEAKE MICROCOMPUTER CLUB, INC., 1618 TILTON DR.. SILVER SPRINGS. MD 20902
COMMODORE USERS MEDUIM BALTIMORE AREA COMPUTER CLUB, C/O WILLIAM J. KOLODNER. P.O. BOX 479. REISTERSTOWN. MD 21136
THE COMPUCATS, 680 WEST BEL AIR AVENUE. ABERDEEN. MD 21001
CUMBERLAND VALLEY APPLE USER'S GROUP, 806 FREDERICK ST.. HAGERSTOWN. MD 21740
E-COM USERS GROUP, INC., BOX 888. RIVERDALE. MD 20737. C/O DELILA TWOOP
EDISON COMMODORE USERS GROUP, 4314 OXFORD DR.. SUITLAND. MD 20746
ENTRE COMPUTER CENTRE, GRAND YORK SHOPPING CENTER. 1815 YORK ROAD. TIMONIUM. MD 21093
FREDERICK APPLE CORE, 1835 MEADOWGROVE LANE. FREDERICK. MD 21701
GAITHERSBURG C-64 USERS GROUP, 12937 PICKERING DR.. GERMANTOWN. MD 20874
HUG-HAGERSTOWN USERS GROUP, JOE RUTKOWSKI. PRES.. 23 COVENTRY LN.. HAGERSTOWN. MD 21740. (301) 797-9728
JUMPERS 2064s (GLEN BURNIE), 7837 B&A BLVD.. GLEN BURNIE. MD 21061
MBC NEWS SANYO USERS NEWSLETTER INT'L, 816 EASLEY ST.. STE. 615. SILVER SPRINGS. MD 20910
THE MONTGOMERY COUNTY COMMODORE COMPUTER SOCIETY, PO BOX 2689. SILVER SPRING. MD 20902. (301) 770-6778
MUMPS USERS GROUP, 4321 HARTWICK RD.. SUITE 510. COLLEGE PARK. MD 20740: (301) 779-6555
NATIONAL CAPITAL ATARI, C/O A. LERMAN. 14905 WATERWAY DRIVE. ROCKVILLE. MD 20853
NEC USERS GROUP, 7121 LORY LN.. LANHAM. MD 20706
ROCKVILLE COMMODORE USERS GROUP, PO BOX 8805. ROCKVILLE. MD 20856
SOUTHERN MARYLAND APPLE USERS GROUP, PO BOX 398. LEXINGTON PARK. MD 20653
SOUTHERN MD- COMMODORE USERS GROUP, 6800 KILLARNEY ST.. CLINTON. MD 20735
TELECOMMUNICATIONS FOR THE DEAF, 5702 FOREST RD.. CHEVERLY. MD 20785
TIBUG P.O. BOX 3. PERRY HALL. MD 21128
TRS-80 USERS GROUP OF BALTIMORE, 102 N. COLLINGTON AVE.. BALTIMORE. MD 21231
VICLIQUE (LINTHICUM HEIGHTS), 105A. CODDIUT ST.. ANNAPOLIS. MD 21401
WASHINGTON APPLE PI, 8227 WOODMONT AVE.. SUITE 201. BETHESDA. MD 20814
WASHINGTON AREA RAINBOW USER'S GROUP, 6415 ADELPHI ROAD. UNIVERSITY PARK. MD 20782. 301-927-0108

MASSACHUSETTS

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APPLESAUCE, 118 BROOKHAVEN DR.. E. LONGMEADOW. MA 01208
APPLESEED, THE CENTRAL MASSACHUSETTS APPLE USERS GROUPS. PO BOX 62. WORCESTER. MA 01614
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THE BOSTON COMPUTER SOCIETY, ONE CENTER PLAZA. BOSTON. MA 02108
BOSTON COMPUTER SOCIETY, 17 CHESTNUT ST.. BOSTON. MA 02108
THE BOSTON COMPUTER SOCIETY ATARI USER GROUP, THREE CENTER PLAZA. BOSTON. MA 02108
BOSTON KAYPRO USERS GROUP, 3 CENTER PLAZA. BOSTON. MA 02108
THE COMMODORE CONNECTION, C/O PAUL JENNEY. 132 NORTH RIDGE RD.. WESTFIELD. MA 01085 (413)568-2228
HIGH-TECH EXPRESS, 7 RING AVE.. QUINCY. MA 02169 (617)773-0011
M.U.N.C.H., 1241 MAIN ST., WORCESTER, MA 06103
MICRO, PO BOX 6502. CHELMSFORD. MA 01824
MAGNETIC (TI 99/4A). 57 RIVER RD.. ANDOVER. MA 01810
MITRE SMALL COMPUTER SOCIETY, MITRE CORP.. C/O M. THEODORE. BEDFORD. MA 01730
NBE BIRD WATCHERS' COMPUTER CLUB, 31 PLUMMER AVENUE. NEWBURYPORT. MA 01950
NEW ENG. COMP SOC, PO BOX 198. BEDFORD. MA 01730
NEWPORT COMPUTER CLUB, C/O CBS. P.O. BOX 389. SOMERSET. MA 02726
NEWTON APPLE KIDS, 77 ROCKPORT RD.. WESTON. MA 02193
NORTH SHORE APPLE GROUP, PO BOX 59. ROCKPORT. MA 01966
PET USERS GRP, WALTHAM HS. NOSTON. MA 02154
SANYO NEW ENGLAND USERS, 125 CONANT ROAD. P.O. BOX 93. WESTON. MA 02193
SMUDGE (DIGITAL GROUP), C/O JEB BOSWELL. M.D.. 29 KENILWORTH ST.. NEWTON. MA 02158
SYNTAX - THE HARVARD GROUP, RD. 2. BOX 457. HARVARD. MA 01451
TRUGEM TRS-80 USERS GROUP OF E. MA., C/O M. SLATE. 42 OAK HILL RD.. SUDBURN. MA 01776
TRVDGEM-TRS-80-MODEL 3/4P USERS GROUP, C/O BILL HEISER. KENDALL SQ. BOX 891. CAMBRIDGE. MA 02142

MICHIGAN

ALTERNATE SOURCE, 704 N. PENNSYLVANIA AVE.. LANSING. MI 48906
THE APPLE D.I.S.C. CLUB, 19206 HARTWELL. DETROIT. MI 48235
APPLE L.U.G., PO BOX 271. HASLETT. MI 48840
THE ATARI CONNECTORS, 15100 DAVID AVENUE. GRAND HAVEN. MI 49417
BASIC 99ER'S, 1504 S. VASSAR RD.. BURTON. MI 48509. (313) 742-1329
BASIC VIC, C/O BRIAN BROWN. 1504 S. VASSAR. BURTON. MI 48509. (313)742-1329
BATTLE CREEK MICROCOMPUTER CLUB, 8587 Q DR.. NORTH BATTLE CREEK. MI 49017
CANTON COLOR COMPUTER CLUB, C/O WADE R. HAMPTON. PO BOX 87586. CANTON. MI 48187-0586
CAPITOL HILL ATARI OWNERS SOCIETY (C..A.O.S.), PO BOX 16132. LANSING. MI 48901
CENTRAL MI TRS 80, 220 E. KALAMAZOO. LANSING. MI 48932
CENTRAL MICHIGAN TRS-80 USERS GROUP, 1309 WOODINGHAM DR.. EAST LANSING. MI 48823
COLOR COMPUTER OWNER'S GROUP, PO BOX 1113. DEARBORN. MI 48121
D:KUG THE DETROIT METROPOLITAN KAYPRO USERS GROUP, P.O. BOX 5187. WARREN. MI 48090-5187
DEARBORN TRS-80 (TM) USERS GROUP, C/O JIM ABBASSIAN. P.O. BOX 1942. DEARBORN. MI 48121
DETROIT INTERACT GROUP, 15356 PREVOST. DETROIT. MI 48227
DETROIT FIRST OSBORNE USERS GROUP, 17452 STAMWICK. LIVONIA. MI 48152. (313) 422-0928
ERCC (EDUCATIONAL, RECREATIONAL COMPUTER CLUB), PO BOX 325. OWOSSO. MI 48867
FLINT INDUSTRIAL MICO APPLICATIONS GROUP, 6068 GROVE AVE.. GRAND BLANC. MI 48439
GRAND RAPIDS 99 USERS GROUP, BOX 1649. GRAND RAPIDS. MI 49501
GRAND RAPIDS APPLE (GRAPPLE), 5326 BROOKWOOD DR. S.E.. KENTWOOD. MI 49508
GREAT LAKES COMPUTER GROUP (TI99/4A), PO BOX 7151. ROSEVILLE. MI 48305
GREATER LANSING COLOR COMPUTER USER'S GROUP (CCUG), P.O. BOX 14114. LANSING MI 48901
GRUG 6441-28TH STREET. GRAND RAPIDS. MI 49506
HACKERS CLUB OF AMERICA, 19200 FREELAND. DETROIT. MI 48235
HEATH USER'S GROUP, HILLTOP RD.. ST. JOSEPH. MI 49085
KALAMAZOO AREA COMPUTER ASSOCIATION, 7044 LEAWOOD. PORTAGE. MI 49081
LAKE SHORE COMPUTER USERS, PO BOX 5062. MUSKEGON. MI 49445
LOWER MICHIGAN 99/4A USERS GROUP, PO BOX 885. TROY. MI 48099
MACE — MICHIGAN ATARI COMPUTER ENTHUSIASTS, PO BOX 2785. SOUTHFIELD. MI 48037
MICHIGAN APPLE COMPUTER CLUB, PO BOX 551. MADISON HEIGHTS. MI 48071
MICHIGAN ATARI GENERAL INFORMATION CONFERENCE, 28111 IMPERIAL DRIVE. WARREN. MI 48093
THE MONROE COMPUTER CLUB, C/O HARDWARE — SOFTWARE INTEGRATIONS. 1811 North Telegraph Road. #72. Monroe. MI 48161-9251
MUG DETROIT, C/O THOMAS C. MUSOLF. 13825 HAVERHILL COURT. SOUTHGATE. MI 48195
NORTHERN GENESSE COUNTY COMMODORE USERS GROUP, P.O. BOX 250. CLIO. MI 48420
SAF USERS GROUP, C/O ROBERT DODGE. PO BOX 313. Mason. MI 48854
SAULT AREA TRS-80 USERS GROUP, C/O JACK DECKER. 1804 WEST 18TH ST. #155. SAULT STE.. MARIE. MI 49783
SCREAMING EAGLES, C/O CLARENCE PERRY. 1131 GREENBRIAR. JEROME. MI 49249
SEMCO, SOUTH EASTERN MICHIGAN COMPUTER ORGANIZATION. PO BOX 02426. DETROIT. MI 48202
SLIPPED DISK, 31044 John R.. Madison Heights. MI 48071. (313)583-9803
SOFT TYPE, 19480 AVON. DETROIT. MI 48219
SORCERER'S APPRENTICE, PO BOX 33. MADISON HEIGHTS. MI 48071
TInformatists USERS GROUP, 5909-2 AMBASSADOR DRIVE. SAGINAW. MI 48603
MIDLAND APPLE CLUB 1710 W. St. Andrews Road. Midland. MI 48640
MIDLAND APPLE CLUB 1710 W. St. Andrews Road. Midland. MI 48640
TInformatists USERS GROUP, 5909-2 AMBASSADOR DRIVE. SAGINAW. MI 48603
TRI-C.U.G., COMMODORE USERS GROUP. PO BOX 45. BAY CITY. MI 48706. C/O MARK D. MEYERS
TRI-CUG, COMMODORE, 1013 NORTH JOHNSON. BAY CITY. MI 48706
WEST OAKLAND COMPUTER USERS GROUP (TRS-80), 1691 EASON. PONTIAC. MI 48054

MINNESOTA

99 COMPUTER GROUP, 5916 FRANCE AVE. S.. EDINA. MN 55410
APPLE MICRO-PIRATES, C/O EVERETT SHUPER. PO BOX 874. HIBBING. MN 55746. (218)262-5746
APPLE MICRO-PIRATES OF VIRGINIA (APPLE), C/O JEREMY TERMEN. 1 TACONITE DR.. MIDWAY. MN 55792. (218)749-8141
THE APPLERS, C/O KEITH KRUEGER. RR 2 BOX 106. LAKE CITY. MN 55041 (612)345-4380
CP/M USERS GROUP OF MINNESOTA, C/O JONATHAN THOMAS. 8040 N.E. GROVELAND RD.. MONDSVIEW. MN 55432
D/C PIRATES (COMMODORE 64) C/O D/C PRODUCTIONS. PO BOX 874. HIBBING. MN 55746
HEARTLAND AREA COMPUTER COOPERATIVE, RT. 4. BOX 204. LITTLE FALLS. MN 56345
MC-10 USERS GROUP, BOX 40 Erskine. MN 56535
METRO-AREA COMMODORE COMPUTER CLUB, BOX M. MENDOTA. MN 55150 (ST. PAUL AREA) 612-729-0232
MICRO-LAB (APPLE) C/O SECTION ART DIVISION. BOX 874. HIBBING. MN 55746
MICRO-PIRATES, C/O NEWSLETTER. 2915 5TH AVENUE. EAST. HIBBING. MN 55746
MINNI'APP'LES, PO BOX 796. HOPKINS. MN 55343
MINN COMP SOC, 8100 34TH AVE. S.. MINNEAPOLIS. MN 55401
MSP 99 USERS GROUP, PO BOX 12351. ST. PAUL. MN 55112
MUNCH VILL-UNIT 8 (THANKS TO MR. HACKER) c/o PAUL. 406 VAN BUREN AVE.. ELELETH. MN 55734
ORGANIZATION OF SOUTH EASTERN MINNESOTA OHIO SCIENTIIC USERS (OSMOSUS), 3218 SILVER LAKE RD.. MINNESOTA. MN 55418
PIRATE SOFTWARE (APPLE) c/o EVERETT. PO BOX 874. HIBBING. MN 55746
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ROCHESTER COMMODORE USERS' GROUP, c/o DAVE MOERTEL. 2526 6th AVE NW. ROCHESTER. MN 55901
SMUGH (ST. PAUL — MINNEAPOLIS USERS GROUP — HEATH), 8895 72ND ST.. COTTAGE GROVE. MN 55016
ULTIMATE PIRATE GUILD, C/O MARK STEIGER. 523 ASPEN GROVE. HIBBING. MN 55746

MISSISSIPPI

ATARI USERS GROUP, 4550 W. BEACH BLVD.. BILOXI. MS 39534. 601-388-4709
BILOXI COMMODORE USERS GROUP, 4550 W. BEACH BLVD.. BILOXI. MS 395334. 601-388-4709
COASTLINE COMMODORE COMPUTER CLUB, P.O. BOX 114. BILOXI. MS 39530-0114: (601) 388-6670
FRANKLIN/APPLE USERS GROUP, 4550 W. BEACH BLVD.. BILOXI. MS 39534. 601-388-4709
GUM TREE COMPUTER CLUB TRS-80 & APPLE, 2609 PEMBERTON. TUPELO. MS 38801. C/O RICHARD SWINEY
HATTIESBURG COMPUTER USER GROUP, C/O BRUCE DINOFF. HATTIESBURG. MS 601-545-1436
HUB COMPUTER USERS GROUP, INC., C/O ELVIS B. GATES. JR.. P.O. BOX 3713. HATTIESBURG. MS 39401
IBM USER GROUP, 3002 HWY.. 90 E.. OCEAN SPRINGS. MS 39564. 601-875-1173
IBM USER GROUP, 4550 W. BEACH BLVD.. BILOXI. MS 39534. 601-388-4709
MCP/M, MICRO COMPUTER PROGRAMMERS OF MISSISSIPPI, C/O H. WINNFRED SMITH 499 PEAR ORCHARD RD.. APT. 5-B. RIDGELAND. MS 39157
METRO-JACKSON MICROCOMPUTER USERS GROUP, 109 HERON COURT. BRANDON. MS 39042
MISSISSIPPI STATE UNIVERSITY MICROCOMPUTER USERS GROUP, C/O DR. GENE BOGGESS MSU COMPUTER CENTER. PO DRAWER CC. MISSISSIPPI STATE. MS 39762. 601-325-2942
O.S.U.G., OCEAN SPRINGSTHE COASTAL AREA ATARI USERS GROUP, PO BOX 5098. BILOXI. MS 39534. ATTN: LEE HITCHESON (601) 388-2836
SOFTWARE SOURCE, 4550 W. BEACH BLVD.. BILOXI. MS 39531
TRS 80 USERS GROUP, 3002 HWY 90 E. OCEAN SPRINGS. MS 39564. 601-875-1173
TRS 80 USERS GROUP, 4550 W. BEACH BLVD.. BILOXI. MS 39534. 601-388-4709
UNIVERSAL COMPUTER SERVICES, 3002 HWY 90E. OCEAN SPRINGS. MS 39564
VIC 20 USERS GROUP, 3002 HWY 90E. OCEAN SPRINGS. MS 39564. 601-875-1173
VIC 20 USERS GROUP, 4550 W. BEACH BLVD.. BILOXI. MS 39534. 601-388-4709

MISSOURI

ACE-ST. LOUIS, P.O. BOX 6783. BRENTWOOD. MO 63144 (314) 647-3290
APPLE USERS GROUP, 411 East Broadway. COLUMBIA. MO 65201
APPLEJACKS OF ST. LOUIS, C/O KENT D. WILBUR. 12 JENNLIND DR.. ST. PETERS. MO 63376
COLUMBIA KAYPRO USERS GROUP, CMS STORE. HITT & BROADWAY. COLUMBIA. MO 65201
COMPUTER USERS' RESOURCE EXCHANGE, P.O. BOX 11065. SPRINGFIELD. MO 65808
FRANKLIN USERS GROUP INT'L, EAST WIND ROAD. SUITE L. TECUMSEH. MO 65760
GREATER KANSAS CITY TRS-80 USERS, PO BOX 27 BELTON. MO 64012
JOPLIN APPLE USER GROUP, 1903 E. 36TH. JOPLIN. MO 64801
JOPLIN REGION PC CLUB, 511 GRANDVIEW DRIVE. JOPLIN MO 64801
JOPLIN SINCLAIR USERS GROUP, P.O. BOX 2221. JOPLIN MO 64803
KANSAS CITY AND INDEPENDENCE PET USERS GROUP 10524 LAKE DR..INDEPENDENCE. MO 64053
NORTH COUNTY TRS-80 USERS GROUP, 12 VILLE DONNA COURT. HAZELWOOD. MO 63042
ST. LOUIS COMPUTER GROUP, 5600 CLAYTON RD.. ST LOUIS. MO 63110
ST. LOUIS 99ERS, 3429 PESTA LOZZI. ST. LOUIS. MO 63118
SLACC, POB 28924. ST. LOUIS. MO 63132
SLKUG — ST. LOUIS KAYPRO USERS GROUP. C/O JOANNA DANEMAN. BOX 31126. ST. LOUIS. MO 63131
SOUTHWEST MISSOURI USERS GROUP, RT 2 BOX 66A STRAFFORD. MO 65757
TIMEX SINCLAIR USERS GROUP OF GREATER KANSAS CITY, C/O CARL MUTCH. JR.. 4701 N.W. LINDEN RD.. N. KANSAS CITY. MO 64151 816-587-8820
THE TRS-80 MODEL II, 12, & 16 INTERNATIONAL USERS GROUP, C/O ROBERT SOKOL. 8437 BELLEVIEW. KANSAS CITY. MISSOURI 64114
TEXAS INSTRUMENTS LICKING USERS' GROUP (LUG'S) PO BOX 439. LICKING. MO 65542-0439

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IBM PC, XT, AT, Portable PC - 128 KB req. - Sample diskettes avail. - Copies sold: 300 since 1982 - Cost: $1,250

Figure 5

RELEVANT ORGANIZATIONS AND SOCIETIES FROM BARRON'S REAL ESTATE HANDBOOK

Source: Barron's Real Estate Handbook (Jack C. Harris, Ph.D., and Jack P. Friedman, Ph.D., C.P.A., S.R.P.A., Barron's, Woodbury, N.Y., 1984)

AMERICAN INSTITUTE OF REAL ESTATE APPRAISERS (AIREA): a professional organization or real estate appraisers affiliated with the National Association of Realtors. AIREA publishes the Appraisal Journal and several reference works on appraisal, provides educational services, and confers the professional designations of MAI (Member, Appraisal Institute and RM. (Residential Member).
ADDRESS: American Institute of Real Estate Appraisers, 430 North Michigan Avenue, Chicago, Illinois 60611

AMERICAN PLANNING ASSOCIATION (APA): a professional organization or regional and urban planners for the purpose of promoting professional standards, research and education. APA was formed by the merger of the American Institute of Planners (AIP) and the American Society of Planning Officials (ASPO). APA publishes a monthly magazine, Planning, and a quarterly journal, Journal of the APA.
ADDRESS: American Planning Association, 1313 East 60th Street, Chicago, Illinois 60637

AMERICAN REAL ESTATE AND URBAN ECONOMICS ASSOCIATION (AREUEA): an organization of scholars, researchers, and practitioners concerned with economic analysis of real estate related problems. Publishes the AREUEA Journal quarterly.
ADDRESS: College of Business Administration, Indiana University, Bloomington, Indiana 47401

AMERICAN SOCIETY OF APPRAISERS (ASA): a professional organization of appraisers (not restricted to real estate). ASA publishes the biannual journal, Valuation.
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continued on page 224

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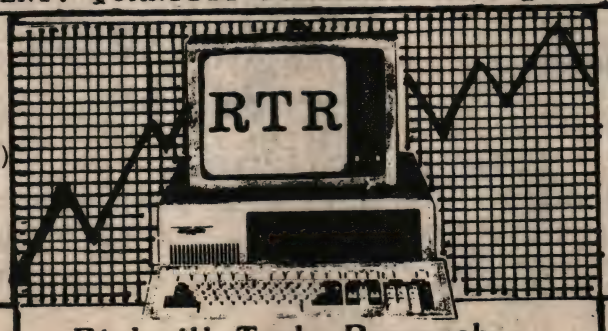
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ADDRESS: American Society of Real Estate Counselors, 430 North Michigan Avenue, Chicago, Illinois 60611

BUILDING OWNERS AND MANAGERS ASSOCIATION (BOMA): an organization of practitioners who own and manage buildings, notably office space.
ADDRESS: 1221 Massachusetts Ave., N.W., Washington, D.C. 20005

INSTITUTE OF REAL ESTATE MANAGEMENT (IREM) a professional organization of property managers. Affiliated with the National Association of Realtors. Publishes the Journal of Property Management.
ADDRESS: Institute of Real Estate Management, 430 North Michigan Avenue, Chicago, Illinois 60611

INTERNATIONAL ASSOCIATION OF ASSESSING OFFICERS (IAAO) a professional organization of property tax assessors. Awards the designation of certified Assessment Evaluator (CAE). Publishes the quarterly Assessors Journal.
ADDRESS: International Association of Assessing Officers, 1313 East 60th Street, Chicago, Illinois 60637

INTERNATIONAL RIGHT OF WAY ASSOCIATION (IR/WA) an individual membership association (no corporate membership) that offers courses covering various phases of right-of-way work. Educational curriculum includes law, engineering, appraisal. Offers a designation, SR/WA, and a bimonthly magazine.
ADDRESS: International Right of Way Association, 6133 Bristol Parkway, Suite 270, Culver City, California 90230

MORTGAGE BANKERS ASSOCIATION (MBA) an organization that provides educational programs and other service for mortgage bankers. Offers the Certified Mortgage Banker (CMB) designation. Publishes Mortgage Banker magazine.
ADDRESS: Mortgage Bankers Association of America, 1125 Fifteenth Street, N.W., Washington, D.C. 20005

NATIONAL APARTMENT ASSOCIATION (NAA) an organization of apartment owners, with local chapters in metropolitan areas, that provides information and services for members concerning apartment rentals, lease forms, occupancy rates, and other matters.
ADDRESS: National Apartment Association, 1825 K Street, N.W., Washington, D.C. 20006

NATIONAL ASSOCIATION OF CORPORATE REAL ESTATE EXECUTIVES (NACORE) membership includes those active with purchasing, selling, and managing real estate held by corporations.
ADDRESS: National Association of Corporate Real Estate Executives, 7799 Southwest 62nd Avenue, South Miami, Florida 33143, N.W.

NATIONAL ASSOCIATION OF HOME BUILDERS (NAHB) an organization of home builders, providing educational, political information and research services. Publishes a monthly magazine, Builder.
ADDRESS: National Association of Home Builders, 15th and M Street, N.W., Washington, D.C. 20005

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ADDRESS: National Association of Realtors, 430 N. Michigan Avenue, Chicago, Illinois 60611

REAL ESTATE SECURITIES AND SYNDICATIONS INSTITUTE (RESSI) and organization of syndicators affiliated with the National Association of Realtors. Offers a newsletter, RESSI Review, on current developments affecting syndications, and educational courses.
ADDRESS: Real Estate Securities and Syndications Institute, 430 N. Michigan Ave., Chicago, Illinois

REALTORS NATIONAL MARKETING INSTITUTE (RMNI) an affiliate of the National Association of Realtors; mainly concerned with educational programs and literature for members. Publishes Real Estate Today (monthly) and Real Estate Perspectives (bimonthly).
ADDRESS: Realtors National Marketing Institute, 430 N. Michigan Avenue, Chicago, Illinois 60611

SOCIETY OF INDUSTRIAL REALTORS (SIR) an organization, affiliated with the National Association of Realtors, whose members are mainly concerned with the sale of warehouses, factories, and other industrial property, Confers SIR designation. Publishes SIR Market Letter (bimonthly) and SIR Newsletter (monthly).
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SOCIETY OF REAL ESTATE APPRAISERS (SREA) an organization in Chicago, Illinois dedicated to professionalism in real estate appraisal. The award designations, ARA, SRPA, SREA.
ADDRESS: Society of Real Estate Appraisers, 645 N. Michigan Avenue, Chicago, Illinois 60611

URBAN LAND INSTITUTE (ULI) a nonprofit organization providing research and information on land use and development. Among the many publications of the ULI are the periodicals, Urban Land and Environmental Comment, and several development guides for specific types of land use.
ADDRESS: Urban Land Institute, 1200 18th Street N.W., Washington, D.C. 20036

WOMEN'S COUNCIL OF REALTORS (WCR) an organization, affiliated with the National Association of Realtors, devoted to preparing women in real estate for their emerging roles in society, to encouraging members to a productive career in real estate, an to developing leadership potential, Publishes The Real Estate Scene (monthly and the WCT Communique (quarterly).
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Timex Sinclair continued from page 62

ten for the QL is called QDOS and the language is SuperBASIC. SuperBASIC is a superset of Sinclair BASIC, so you can type in almost all BASIC software with little, if any, modification. Of course, any machine code programming would have to be rewritten into 68000 code, any graphics will have to be recalculated, and some syntax will have to be adjusted. Also, so far I have not been able to find any equivalents to the ON ERR statements of the T/S 2068 as Sinclair did not include them in SuperBASIC. (They were never included in Sinclair BASIC on the Spectrum either.) But simply taking BASIC programs from your earlier model Sinclair computers and translating them line for line does not take advantage of the many additions and improvements that the QL is capable of. In future columns we will take an in-depth look at using SuperBASIC, but here are some of the highlights.

SuperBASIC has taken features of BASIC and other popular programming languages and incorporated them into what Sinclair hopes will be the state of the art in computer languages. Unlike other versions of interpreted BASIC (SuperBASIC itself is an interpreted language), the length of the program does not affect its running speed. Also, SuperBASIC addresses one of the criticisms of the BASIC language--that it is a sloppy language. Borrowing ideas from Pascal, SuperBASIC relies very heavily on the *procedure*. Instead of subroutines accessed by a GO SUB *line number* statement, each procedure has its own name with which it is called. Even the variables within each procedure may be isolated from those of the rest of the program by declaring them to be LOCAL. Variable values may be passed to and from the main program and the procedure by declaring them in the proper places. This is a great help to the programmer who now may keep a library of often-used routines on file and merge them when developing new software.

The QL is often able to accept input that is in the wrong form (such as string input which should be floating point) and change it into the proper form. This will eliminate situations where a running program would be stopped by an error. This type of intelligent data handling is typical of the way Sinclair tried to design the QL.

My overall opinion of the QL is that it is a terrific machine, especially when you realize that you can buy it for under $300.00. For that money, you not only receive the computer and two microdrives (with four blank cartridges that hold approximately 100K each), but four sophisticated software packages worth many times the cost of the computer (if you were to buy comparable programs for such as the IBM-PC). Except for a few minor improvements needed by the keyboard, the computer itself is well designed. It is easily expandable both for additional memory as well as hardware additions. Unlike the new machines from Apple and Atari, there already exists a great deal of software ready to be bought since it has been around in the U.K. for about a year now. American software development is already under way. Curry Computer is even issuing a monthly *QL Report*. (Check the classified section and page 158 in this issue of *Computer Shopper* for information on QL suppliers.)

On the down side is the poor manual included with the QL. If you simply want to use packaged software, this manual will be close to sufficient. Even in that case, though, the sections of the guide that are the documentation for the bundled software still fall short of being complete. If, on the other hand, you are going to do any programming, especially complex programming, you will find that it is necessary to purchase one of the independently written books on the subject. I will be looking at these books and reporting them here. It's too bad that such a well thought out computer has to be accompanied by an incomplete *User's Guide*.

But all things considered, yes, I would indeed recommend it. I hope that Sinclair does a better job in promoting this computer than Timex did with the T/S line. Remember that outside of North America, Sinclair micros are among the most popular home computers.

Next month, we will look at the four Psion programs included with the QL, as well as some of the independent software now available. Curry Computer, P.O. Box 5607, Glendale, AZ 85312, (602) 978-2902 ●

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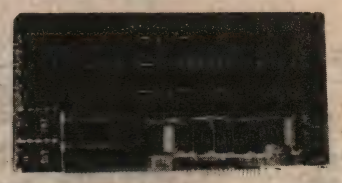
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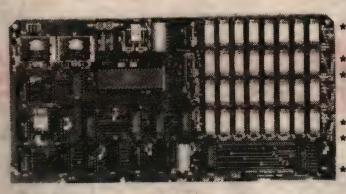
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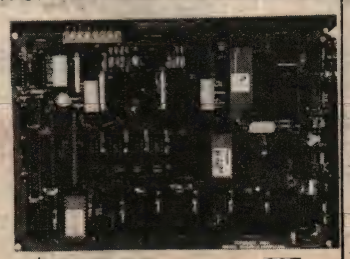
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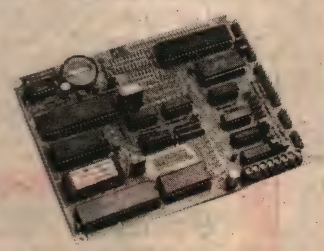
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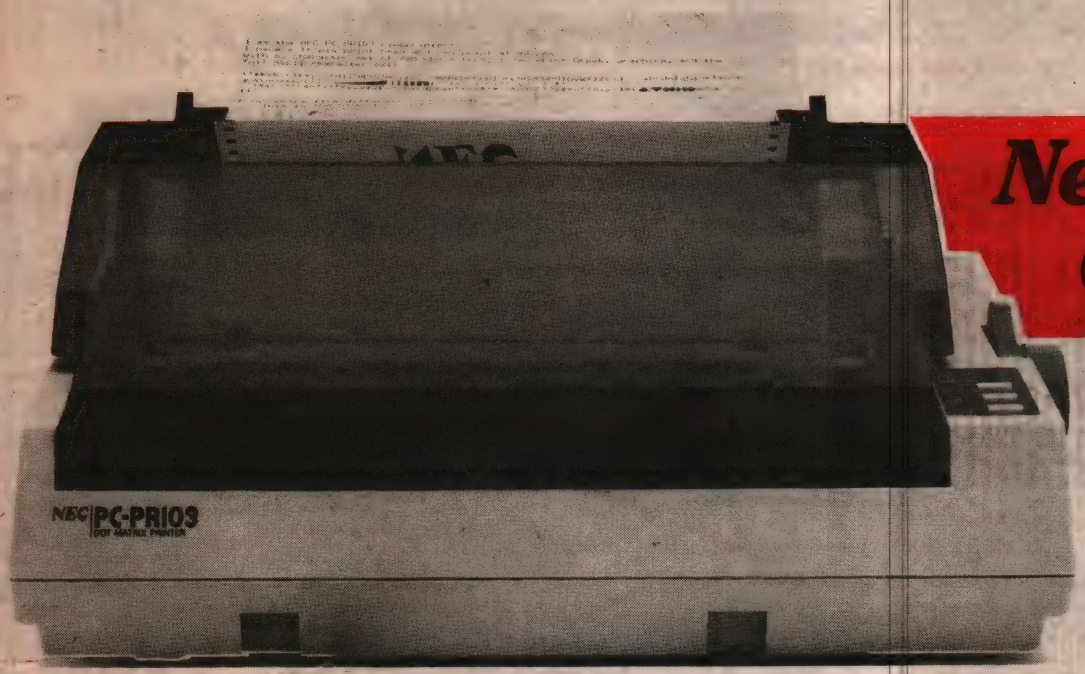
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Guarantee—This NEC printer comes complete with a full 90 day factory warranty. Service is available nationwide from NEC authorized service centers.

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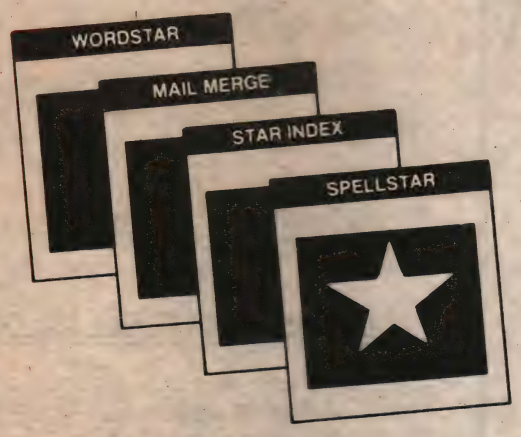
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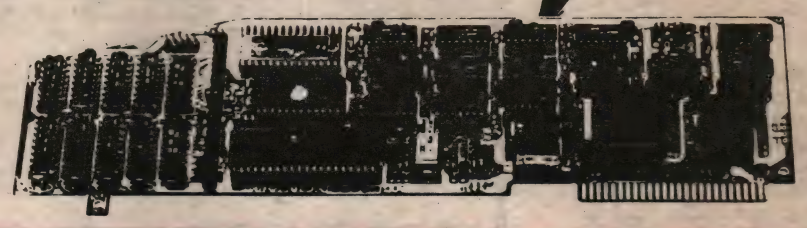
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Starindex

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AP261-DE2	Apple Spellstar	~~99~~	75
AP271-DE2	Apple Starindex	~~99~~	75
AP281-DE2	Apple Mailmerge	~~99~~	75
AP201-DE2	Apple Mailmerge, Spellstar combination	~~198~~	99
AP211-DE2	Apple Spellstar, Starindex combination	~~198~~	99
AP221-DE2	Apple Mailmerge, Starindex combination	~~198~~	99
AP231-DE2	Apple Mailmerge, Spellstar, Starindex combination	~~297~~	119
P161-DE2	IBM Correctstar	~~99~~	75
P171-DE2	IBM Starindex	~~99~~	75
P181-DE2	IBM Mailmerge	~~99~~	75
P101-DE2	IBM Mailmerge, Correctstar combination	~~245~~	99
P111-DE2	IBM Correctstar, Starindex combination	~~245~~	99
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Bixcomp smart modem 300/1200.....$189.00
Team smart modem 300/1200.....$229.00
576K memory card w/ØK.....$ 59.00

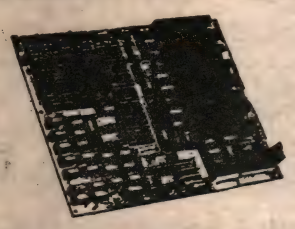


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light pen interface, 4 text &
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* 640K RAM
* optional math co-processor*
* fully tested * fully compatible

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* for hard drive information see our list!

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color RGB 640X200, switches amber/green..$369.00
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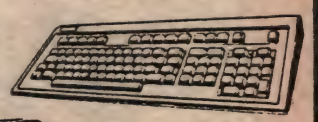
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135W side switch.....$ 79.00
200W side switch (PC).....$109.00
200W side switch (AT).....$129.00

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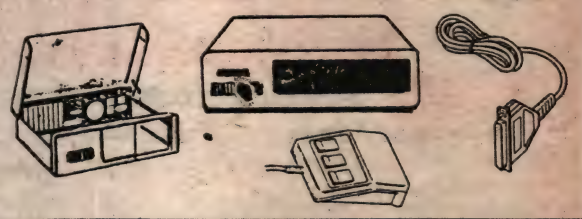
5150 style.....$ 69.00
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slide-out of flip-up case.....$ 59.00
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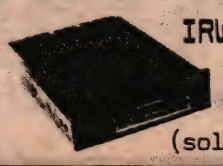
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20 MB half-height..65 MS...Seagate.....$ 539.00
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30 MB full-height..40 MS...Seagate.....$ 989.00
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40 MB full-height..40 MS...Seagate.....$1299.00
43 MB full-height..45 MS...Rodine.....$1329.00
66 MB full-height..30 MS...Toshiba.....$1999.00



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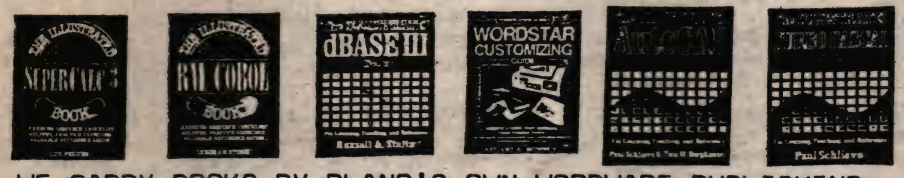
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Diablo 630 printer	$ 700.00
Epson QX PC	$ 800.00
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Compaq DeskPro 2	$2100.00
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Morrow Design CP/M system	$ 600.00
IBEX 2200 system	$ 450.00
Silent 700 KSR terminal	$ 129.00
TI 994A system...NEW	$ 89.00
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Radio Shack Mdl I	$ 400.00
North Star 8080 CPU/Esprit terminal	$ 500.00
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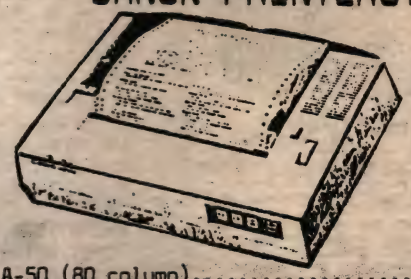
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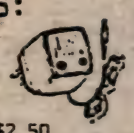
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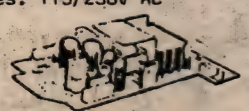
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+ 9V @ 1.5A
+12V @ 2A
+17V @ 1.5A
+34V @ 2.25A

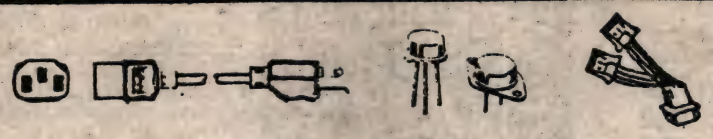


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Y power cables	$ 4.00
Xerox 820/822 EProm programmer	$ 89.00
7400 series chips	$ CALL
5¼" Xerox 820/822 drive cables	$ 7.00



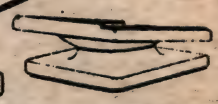
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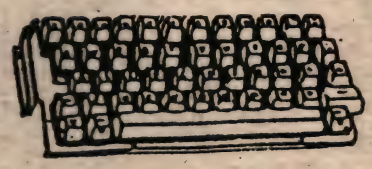
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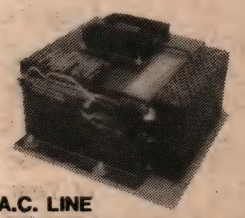
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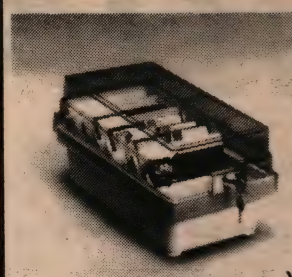
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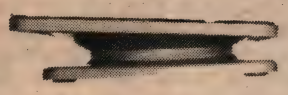
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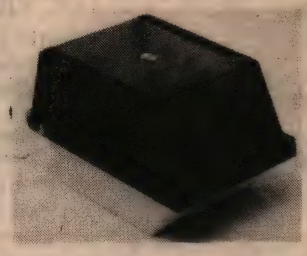


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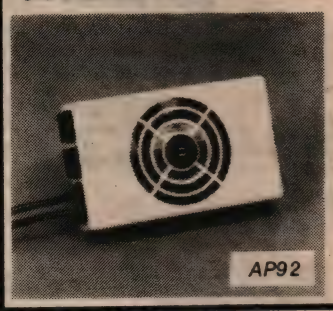
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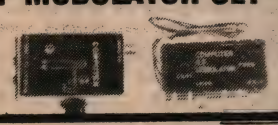
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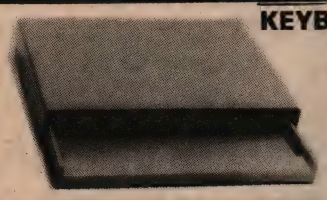
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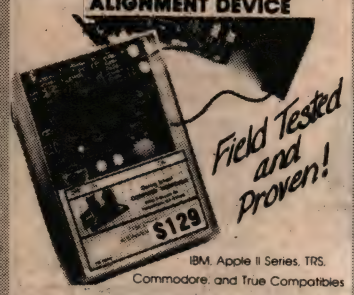
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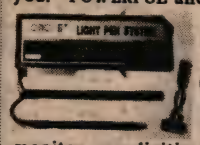
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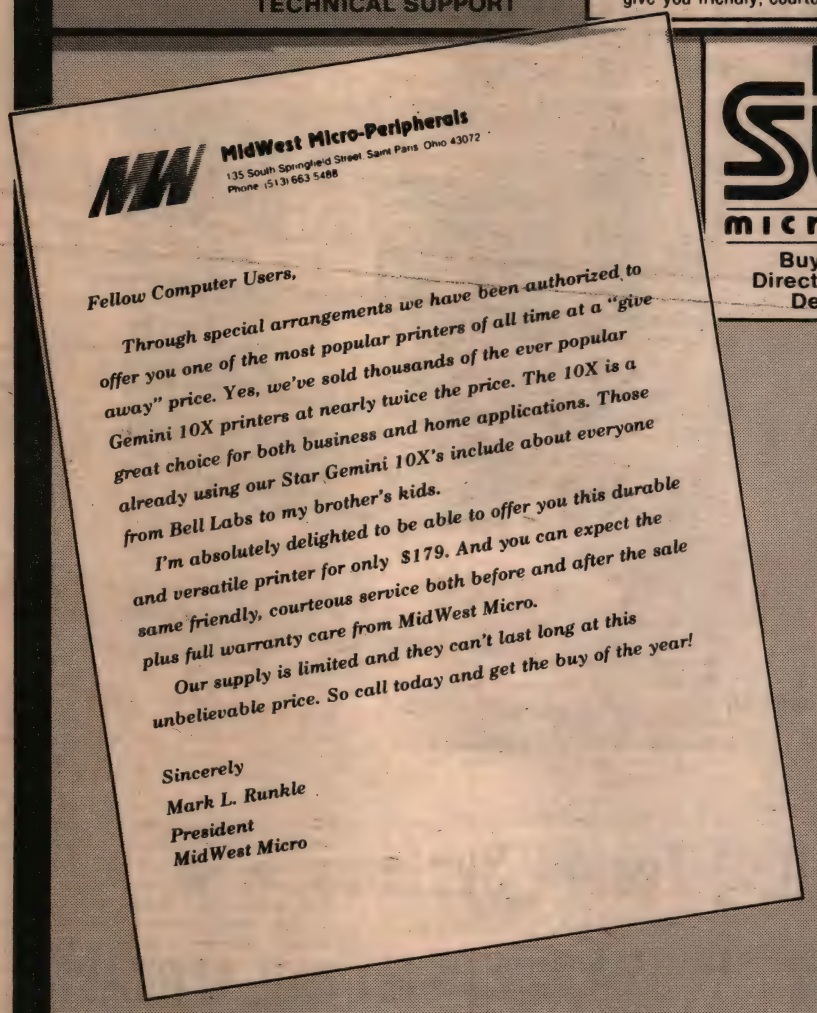
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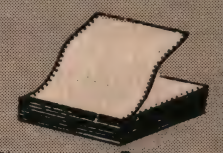

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add-post-AP ... add postage, all prices
FC ..... Freight Collect
MBG ..... money back guarantee
PP ..... postage paid
SASE ..... send self-addressed stamped evelope for check return or information requested
10 DRP ..... 10 day return privilege
CCR ..... check clearance required

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Normal

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COMP-USED
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Wanted: Mod I, 48K El w/doubler, LC using s/o keys. Disks if 40TR flippies (Pertec). Write Details, use, & asking price. **Hexco,** Box 199, Hunt, TX 78024. 3-75

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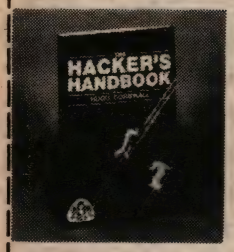
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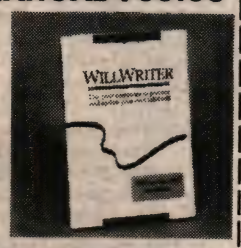


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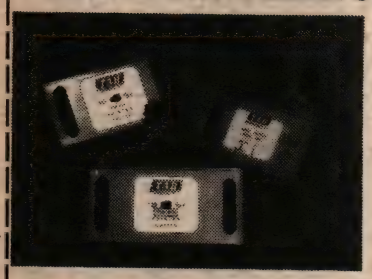
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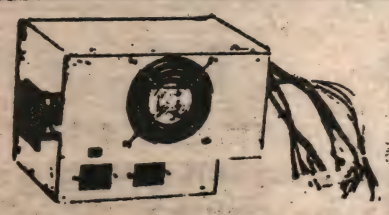
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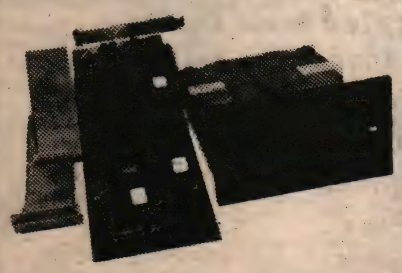


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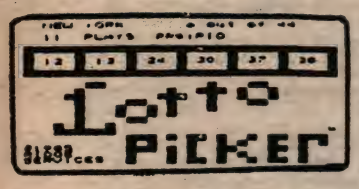
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Apple II+, CP/M, w/2 DD and 2, 8" Iobo drive. Every slot filled. Amber monitor included and software. $1500. **Call Jim, 212-505-3011.** 4-78

Apple IIe compatible Franklin Ace 1000, 64k, includes Wildcard card plus software. $275, hurry! **Mike 305-656-3804,** evenings.

Apple II+, monitor, disk drive, printer, with 200+ programs, $690. Call **Walt, 803-279-7500** N. Augusta, SC, Excellent condition S&H - COD). 3-76

Apple II+, monitor, disk drive, printer, and over 200+ programs $650. Call **Walt VanDine, 803-279-7500** N. Augusta, SC. 3-75

Mac 512k, $1695; Mac Expansion Drive $400; Imagewriter Printer $450. Call **Weber Systems 216-729-2858.**

B.B.I. WHOLESALE NETWORK- A membership B.B.I. for USED and NEW "Special Buy" computers. See display ad in **COMPUTER SHOPPER** Mart or call **916-344-1956.** 2-75

BUY/SELL USED COMPUTERS

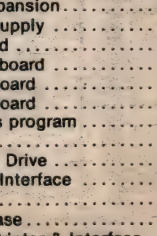
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For Sale: Apple IIe Compatible computer 128K with disk drive and 80 col. card $650. **Jim Moore. 504-386-2329** or 800-821-5226 Ext. 124. 1-77

Genuine Apple IIe motherboard and keyboard sets $250. Call **Computer Reset, 214-276-8072.** 4-76



Attention Wordstar Users!
Up to 60% off:

For Apple II, II+, IIe

Spellstar - correct spelling from 20,000 word disctionary. **Starindex** -creates alphabetized indices and tables of contents. **Mailmerge** - merges files for personalized form letters; assembles mailing labels. Any single package -list price is $99, our price is $75 (25% off). Combination of any two different packages -list price is $198, our price is $99. (50% off). All three packages -list price is $297, our price is $119. (60% off). Call **BCE,** 7 days a week, 24 hours a day. **1-800-545-7447.** See ad index for other BCE bargains!

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GODFATHER'S used computer SYNDICATE

$$$$ Call Us For the latest closeouts on Compatibles and Used Apples. **Godfather's Used Computer Syndicate,** PO Box 3037, 1154 W. SR 436, Forest City, FL 32714. **305-774-1111.** 3-76

RAM CARD for Apple IIe! 512K = $149. Call **Rick Stealey 201-876-4586.** Compuserve ID = 70317, 2364. 3-75

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APPLE STUFF (1 or 2)	*
Video Modulator	$5
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2+ Case/Keyboard	$70
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RS 232 Board	$25
2+ 16K Board	$25
2+ 80 col. bd. (as is)	$10
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II Disk Cont. (Franklin)	$40
2e 80 Col. bd.	$25
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2+ 64k Expansion	$50
2e Power Supply	$40
2e Keyboard	$60
2+ Motherboard	$175
2e Motherboard	$250
2c Motherboard	$285
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Disk II	$150
2c External Drive	$110
2c Parallel Interface	$45
Mouse	$60
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Silentype Printer & Interface	$60
Apple Monitor Stand	$15
Monitor II	$75
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Keyport 717	$75
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COMMODORE STUFF!	
1541 Flash	$45
1650 Modem	$40
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MPS801 Printer (as is)	$25
1520 Plotter	$25
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Light Pen (Edumate)	$15
Koala Pad	$45
4040/IEEE Interface	$400
Gemini 10	$100
NEC 8023 A-C	$150
ON A REGULAR BASIS!	
IIe CPU	$525
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WordStar Professional

80% OFF

WordStar **SpellStar**
MailMerge **StarIndex**



+
Appli-Card CP/M Board



For Apple II, IIe, II+
$169

The package includes **Wordstar** version 3.3, Spellstar, mailmerge, and Starindex. Also included is an **Appli-Card CP/M board** (made by PCPI, also sold as Starcard). Runs CP/M 2.2, Z80B, 6 MHz, 70 column display without 80 column card (80 column display with 80 column card). One year manufacturers warranty. **Wordstar Professional and Appli-card** -list price is $870, our price is $169 (80% off). **Wordstar Professional** - list price is $395, our price is $139 (65% off). **Appli-Card CP/M Board** -list price $475, our price is $119 (75% off). Quantities are limited: to order call **BCE,** toll free 7 days a week, 24 hours a day. **1-800-545-7447.** See ad index for other super BCE bargains!

(107) APPLE COMPUTERS WANTED

All used products over $100. Buy/sell through nationwide listing service. **NO CHARGE** for buying direct from owner. **NO RISK** for sellers - 6% commission when successful. Open 24 hours if you have a touchtone phone. **203-762-8677.**

COMP-USED

85 Rivergate Drive, Wilton, CT 06897. 3-76

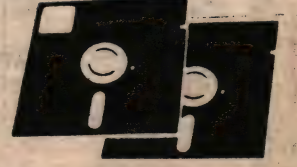
Apple IIC Numeric Keypad

User installable, cursor & tab keys for Apple Works, no soldering or cutting required, no modifications required for standard keypad. $99.95 each, 3 at $65 ea. Add $20 for Plug in model (requires case modification) **C&M Manufacturing,** 2400A Ave. I, Huntsville, TX 77340. **409-291-6005** 10-6 CST. **We buy Apple IIC's.**

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.. For an offer you can't refuse ...
GODFATHER'S used computer SYNDICATE

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7400

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SN7402N	.19	SN7486N	.35
SN7404N	.25	SN7489N	1.95
SN7405N	.29	SN7490N	.39
SN7406N	.29	SN7493N	.35
SN7407N	.29	SN74121N	.29
SN7408N	.25	SN74123N	.49
SN7410N	.19	SN74125N	.45
SN7414N	.45	SN74126N	.49
SN7416N	.35	SN74143N	3.95
SN7417N	.35	SN74150N	1.29
SN7420N	.19	SN74154N	1.25
SN7430N	.19	SN74158N	1.39
SN7432N	.29	SN74173N	.75
SN7438N	.29	SN74174N	.59
SN7442N	.45	SN74175N	.59
SN7445N	.69	SN74176N	.89
SN7446N	.79	SN74181N	1.95
SN7447N	.79	SN74189N	1.95
SN7448N	.79	SN74193N	.69
SN7472N	.39	SN74198N	1.35
SN7473N	.35	SN74221N	.89
SN7474N	.35	SN74273N	1.95
SN7475N	.39	SN74365N	.59
SN7476N	.35	SN74367N	.59

74LS

74LS00	.19	74LS165	.79
74LS02	.19	74LS166	.89
74LS04	.25	74LS173	.49
74LS05	.25	74LS174	.39
74LS06	.99	74LS175	.39
74LS07	.99	74LS189	3.95
74LS08	.19	74LS191	.49
74LS10	.19	74LS193	.69
74LS14	.39	74LS221	.59
74LS27	.25	74LS240	.69
74LS30	.19	74LS243	.69
74LS32	.25	74LS244	.69
74LS42	.39	74LS245	.79
74LS47	.89	74LS259	1.19
74LS73	.35	74LS273	.79
74LS74	.25	74LS279	.39
74LS75	.29	74LS322	2.95
74LS76	.29	74LS365	.39
74LS85	.49	74LS366	.39
74LS86	.25	74LS367	.39
74LS90	.39	74LS368	.39
74LS93	.39	74LS373	.79
74LS123	.49	74LS374	.79
74LS125	.39	74LS393	.79
74LS138	.39	74LS590	5.95
74LS139	.39	74LS624	1.95
74LS154	1.49	74LS629	2.49
74LS157	.35	74LS640	.99
74LS158	.35	74LS645	.99
74LS163	.49	74LS670	.99
74LS164	.49	74LS688	1.95

74S/PROMS*

74S00	.29	74S188*	1.75
74S04	.35	74S189	1.95
74S08	.35	74S196	1.49
74S10	.29	74S240	1.49
74S32	.35	74S244	1.49
74S74	.49	74S253	.79
74S85	1.49	74S287*	1.69
74S86	.35	74S288*	1.69
74S124	2.75	74S373	1.69
74S174	.79	74S374	1.69
74S175	.79	74S472*	3.49

74ALS

74ALS00	.35	74ALS138	.89
74ALS02	.35	74ALS174	.89
74ALS04	.39	74ALS175	.89
74ALS08	.35	74ALS240	1.79
74ALS10	.35	74ALS244	1.79
74ALS27	.39	74ALS245	2.49
74ALS30	.35	74ALS373	1.95
74ALS32	.39	74ALS374	1.95
74ALS74	.55	74ALS573	1.95

74F

74F00	.59	74F139	1.29
74F04	.65	74F157	1.29
74F08	.59	74F193	4.95
74F10	.59	74F240	2.49
74F32	.65	74F244	2.49
74F74	.69	74F253	1.79
74F86	.89	74F373	2.95
74F138	1.19	74F374	2.95

CD—CMOS

CD4001	.19	CD4081	.25
CD4011	.19	CD4082	.25
CD4013	.35	CD4093	.39
CD4016	.29	CD4094	1.49
CD4017	.49	CD40103	2.95
CD4018	.69	CD4503	.49
CD4020	.59	CD4510	.69
CD4024	.49	CD4511	.69
CD4027	.39	CD4515	1.39
CD4030	.39	CD4518	.79
CD4040	.65	CD4520	.79
CD4049	.29	CD4522	.79
CD4050	.29	CD4538	.89
CD4051	.65	CD4541	.89
CD4052	.65	CD4543	.99
CD4053	.65	CD4553	4.95
CD4059	3.49	CD4555	.89
CD4060	.89	CD4566	1.95
CD4066	.29	CD4583	1.19
CD4069	.25	CD4584	.59
CD4070	.29	CD4585	.75
CD4071	.25	MC14411	9.95
CD4072	.25	MC14490P	4.49
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*Specs. Available @ $1.50 ea.		*6567VIC-II ~~44.95~~	19.95	NOTE: 82S100 = U17 (C-64)	

MOTOROLA



MC68701-Microcomputer with EPROM

The MC68701 is an 8-bit single chip microcomputer unit (MPU) which significantly enhances the capabilities of the MC6800 family of parts. On-chip resources include 2048 bytes of EPROM, 128 bytes of RAM, Serial Communications Interface (SCI), parallel I/O, and a three function Programmable Timer.

MC68701 . . . . . $24.95

MICROPROCESSOR COMPONENTS

MICROPROCESSOR CHIPS Part No.	Price
D765AC	4.95
CDP1802CE	9.95
2661-3	6.95
Z80, Z80A, Z80B, SERIES	
Z80	1.75
Z80-CTC	1.79
Z80-DART	4.95
Z80-P10	1.79
Z80A	1.85
Z80A-CTC	1.89
Z80A-DART	5.25
Z80A-P10	1.95
Z80A-S10/0	5.25
Z80B	3.95
Z80B-CTC	4.95
Z80B-P10	4.95
6500/6800/68000 SER.	
6502	2.75
6520	2.95
6522	4.95
6532	6.49
6551	6.95
6800	1.95
6802	4.95
6810	1.95
6821	1.95

6500/6800/68000 Cont. Part No.	Price
6840	6.75
6843	19.95
6845	4.95
6850	1.95
6852	4.75
68000L8	9.95
68661	8.95
8000 SERIES	
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80C31BH	19.95
8035	1.95
8073N	29.95
8080A	3.95
8085A	2.75
8086-2	8.95
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8087-2 (8MHz)	139.95
8088	7.95
8116	8.95
8155	2.75
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8202	9.95
8203	29.95
8212	1.95
8224	2.25
8228	3.49
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8243	2.49
8250A	6.95
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8251A	2.25
8253-5	2.25
8254	9.95
8255A-5	2.25
8257-5	2.49
8259-5	2.49
8272	4.95
8279-5	2.95
8741	8.95
8748	7.95
8749	9.95
8751	29.95
8755	14.95
DATA ACQUISITION	
ADC0804	3.49
ADC0808	8.95
ADC0809	3.95
ADC0816	14.95
ADC0817	8.95
DAC0808	1.95
DAC1008	7.95
AY-3-1015D	4.95
AY-5-1013A	3.95

DYNAMIC RAMS

Part No.	Function		Price
4116N-15	16,384 x 1	(150ns)	.89
4128	131,072 x 1	(200ns)	4.95
4164N-150	65,536 x 1	(150ns)	1.25
4164N-200	65,536 x 1	(200ns)	1.19
TMS4416-12	16,384 x 4	(120ns)	4.95
MM5280	4096 x 1	(200ns) 2107	1.95
8118	16,384 x 1	(120ns) (+5V Only Required)	1.95
41256-150	262,144 x 1	(150ns)	3.29
50464-15	65,536 x 4	(150ns) (4464) (41464)	7.95

STATIC RAMS

TMM2016-12	2048 x 8	(120ns)	1.69
2102	1024 x 1	(350ns)	.89
2102-2L	1024 x 1	(250ns) LP (91L02)	1.49
2114N	1024 x 4	(450ns)	.99
2114N-L	1024 x 4	(450ns) LP	1.09
2114N-2	1024 x 4	(200ns)	1.05
2114N-2L	1024 x 4	(200ns) LP	1.49
21C14	1024 x 4	(200ns) (CMOS)	.49
2149	1024 x 4	(45ns)	4.95
5101	256 x 4	(450ns) CMOS	3.95
HM6116P-3	2048 x 8	(150ns) CMOS	1.79
HM6116LP-3	2048 x 8	(150ns) LP CMOS	1.85
HM6264P-12	8192 x 8	(120ns) CMOS	4.69
HM6264LP-12	8192 x 8	(120ns) LP CMOS	4.79
HM6264P-15	8192 x 8	(150ns) CMOS	4.49
HM6264LP-15	8192 x 8	(150ns) LP CMOS	4.59
6514	1024 x 4	(350ns) CMOS (UPD444C)	4.49

PROMS/EPROMS

1702A	256 x 8	(1μs)	3.95
2708	1024 x 8	(450ns)	3.95
TMS2716	2048 x 8	(450ns) 3 voltage	6.49
2716	2048 x 8	(450ns)	2.49
27C16	2048 x 8	CMOS	9.95
2732	4096 x 8	(450ns)	2.49
2732A-20	4096 x 8	(200ns) 21V	3.95
2732A-45	4096 x 8	(450ns) 21V	2.75
27C32	4096 x 8	CMOS	10.95
2758	1024 x 8	(450ns) Single +5V	3.95
2764-20	8192 x 8	(200ns) 21V	3.95
2764A-25	8192 x 8	(250ns) 12.5V	2.95
2764-45	8192 x 8	(450ns) 21V	2.19
27C64	8192 x 8	CMOS 21V	6.95
27128-25	16,384 x 8	(250ns) 128K 21V	2.95
27256-25	32,768 x 8	(250ns) 256K (12.5V)	7.95
27C256-25	32,768 x 8	(250ns) 256K (CMOS) (12.5V)	13.95
68764	8192 x 8	(450ns) 25V	15.95
68766	8192 x 8	(350ns) 25V	16.95
74S387	256 x 4	PROM O.C.	1.69
74S471	256 x 8	PROM T.S.	4.95
82S123	32 x 8	PROM T.S.	2.95
82S129	256 x 4	PROM T.S.	2.95

LOW PROFILE (TIN) SOCKETS

Part No.	1-9	10-99	100-up
8 pin LP	.13	.12	.11
14 pin LP	.15	.13	.11
16 pin LP	.17	.15	.13
18 pin LP	.25	.23	.21
20 pin LP	.28	.26	.23
22 pin LP	.30	.28	.26
24 pin LP	.31	.30	.29
28 pin LP	.39	.37	.35
40 pin LP	.49	.46	.43

WIRE WRAP SOCKETS (GOLD) LEVEL #3

Part No.	1-9	10-99	100-up
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10 pin WW	.65	.59	.55
14 pin WW	.69	.65	.59
16 pin WW	.75	.69	.65
18 pin WW	.85	.79	.75
20 pin WW	.95	.89	.85
22 pin WW	.99	.95	.89
24 pin WW	1.19	1.09	.99
28 pin WW	1.39	1.29	1.19
36 pin WW	1.49	1.39	1.29
40 pin WW	1.79	1.69	1.59

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The MM5321 is a TV camera sync generator designed to supply the basic sync functions for either color or monochrome 525 line/60Hz interfaced and camera video recorder applications. **COLOR BURST GATE & SYNC ALLOW STABLE COLOR OPERATION**

MM5321 . . . . . $9.95

DIGITALKER™

DT1050 — Applications: Teaching aids, appliances, clocks, automotive, telecommunications, language translations, etc. The DT1050 is a standard DIGITALKER kit encoded with 137 separate and useful words, 2 tones, and 5 different silence durations. The words and tones have been assigned discrete addresses, making it possible to output single words or words concatenated into phrases or even sentences. The "voice" output of the DT1050 is a highly intelligible male voice. **The DT1050 consists of a Speech Processor Chip, MM54104 (40-pin) and two (2) Speech ROMs MM52164SSR1 and MM52164SSR2 (24-pin) along with a Master Word list and a recommended schematic diagram on the application sheet.**

Part No.	Description	Price
DT1050	Digitalker™	$24.95
MM54104	Processor Chip	$12.95

DT1057 - Expands the **DT1050** vocabulary from 137 words to over 250 words. Includes two (2) ROMs and specs.

DT1057 . . . . . $11.95

INTERSIL

Part No.	Price	Part No.	Price
FE0202D	12.95	7207AEV/Kit	8.49
FE0203D	12.95	7211IPL (TTL)	7.95
7106CPL	8.95	7211MIPL (Micro)	8.49
7106EV/Kit	46.95	7217IJI	10.95
7107CPL	8.95	7217AIPI	8.95
7107EV/Kit	46.95	7224IPL	10.95
7207AIPD	5.95	7226AEV/Kit	99.95

74HC HI-SPEED CMOS

74HC00	.35	74HC175	.89
74HC02	.39	74HC221	1.95
74HC04	.39	74HC240	1.39
74HC08	.39	74HC244	1.49
74HC10	.39	74HC245	1.59
74HC14	.59	74HC253	.79
74HC30	.39	74HC259	1.19
74HC32	.45	74HC273	1.79
74HC74	.45	74HC373	1.49
74HC75	.69	74HC374	1.49
74HC76	.69	74HC393	1.19
74HC85	1.19	74HC595	1.95
74HC86	.59	74HC688	1.95
74HC123	1.19	74HC4040	1.19
74HC125	.99	74HC4049	.79
74HC132	.79	74HC4050	.79
74HC138	.79	74HC4060	1.19
74HC139	.79	74HC4511	1.95
74HC154	1.95	74HC4514	2.95
74HC163	.89	74HC4538	1.95
74HC174	.89	74HC4543	2.95

74C—CMOS

74C00	.29	74C174	.89
74C02	.29	74C175	.89
74C04	.25	74C221	1.19
74C08	.35	74C240	1.59
74C10	.29	74C244	1.59
74C14	.49	74C373	1.95
74C32	.35	74C374	1.95
74C74	.49	74C912	7.95
74C85	1.19	74C915	1.19
74C86	.29	74C920	9.95
74C89	3.95	74C921	9.95
74C90	.89	74C922	3.95
74C154	2.95	74C923	3.95
74C173	.89	74C925	4.95

LINEAR

DS0026CN	1.69	LM399H	3.95
TL074CN	.79	TL497ACN	2.19
TL084CN	1.09	NE540H (C540H)	2.95
LM307CN	.45	NE555V	.29
LM309K	1.25	XR-L555	.69
LM311CN	.45	LM556N	.59
LM317T	.99	NE558N	1.19
LM318CN	1.19	LM565N	.99
LM319N	1.19	LM567V	.89
LM320K-5	1.35	NE592N	.89
LM320T-5	.59	LM741CN	.29
LM323K	4.49	LM747N	.59
LM324N	.39	LM1458CN	.49
LM338K	3.95	LM1488N	.69
LM339N	.49	LM1489N	.69
LM340K-5	1.35	LM1496N	.99
LM340K-12	1.35	LM1871N	1.95
LM340K-15	1.35	LM1872N	2.49
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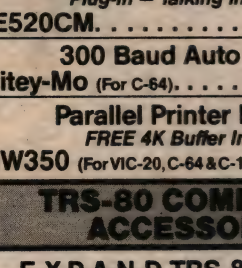
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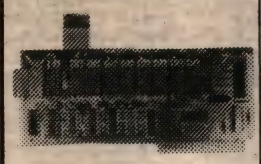
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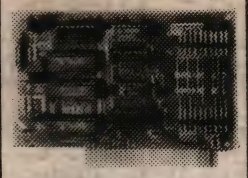
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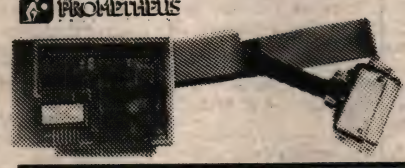
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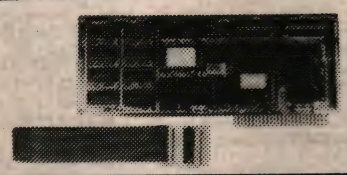
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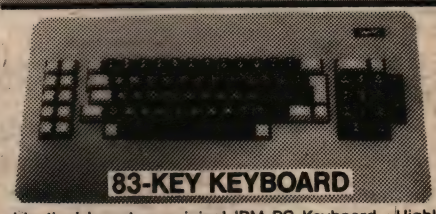
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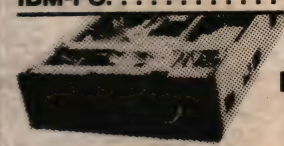
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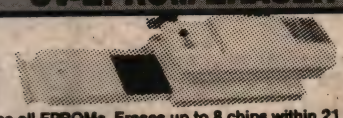
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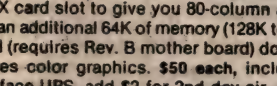
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Display, save, print your baseball or softball team's roster, batting, fielding, pitching statistics just like the pros (up to 20 players/team, 30 teams/disk) Specify **C64/IBM/APPLE.** $19.95 (disk only). Money back guarantee. **Scoreboard Software**, Dept. CA4, POB 31566, Phoenix, AZ 85046. 4-77

COMPUTEREYES by Digital vision $105, with camera $310; Modem with software, $64.97; Summer Games II by Epyx $26.75; COMPUSERVE Starter Kit $25.97. Prices Include Shipping. To order send payment or call, VISA/Mastercard accepted. PA residents add 6% Sales Tax. **Seneca Software**, 1104 Seneca Drive, RD #2, Harmony, PA 16037. **412-452-8418.**

CP/M SIDEKICK

WRITE-HAND-MAN a Sidekick like utility for CP/M 3.3. (Softcard and PCPI). See CP/M software. 3-76

CUSTOM APPLE PARTS

WE'VE OBTAINED a small supply of many of the custom ICs for the Apple II + and Apple IIe computers. These are real Apple parts, some new, some used, all tested and guaranteed. ROMs, keyboard encoders, P5A, P6A, video character generators, HAL/PAL, MMU etc. All priced below Apple wholesale. Enquiries from repair services who know what they want are welcome. We are NOT able to advise clone builders which parts are suitable for which clones. **Electrovalue Industrial**, Box 376-CP, Morris Plains, NJ 07950. 201-267-1117, M-F, 10-5. 1-83

DISK NOTCHER (Square 5¼" diskettes) $4.95; DISKETTE STORAGE BOXES (5¼", holds 120 w/lock) $13.95 OR both items $16.95; Send to: **Computer Hardware & Software**, 1815 26th Street, Cuyahoga Falls, OH 44223. 3-76



][+ & FRANKLIN USERS GROUP

SUPPORTING][+ s, Franklins, & all compatibles a monthly newsletter, public domain library & personal attention. Membership $20 a year. Info SASE. **Franklin Users Group International**, 83 East Wind, Tecumseh, MO 65760. Modem 417-869-5249. 3-76

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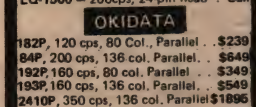
Epson FX-85 — 160cps, NLQ . . . Call
FX-286 — Emulates IBM ProPrinter Call
JX-80 Color Printer — 80 column . Call
LX-80 — 80 column, NLQ mode . Call
LQ-1500 — 200cps, 24-pin head . Call

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84P, 200 cps, 136 col. Parallel. . . $649
192P, 160 cps, 80 col. Parallel . . $349
193P, 160 cps, 136 col. Parallel. . $549
2410P, 350 cps, 136 col. Parallel $1895

IBM

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IBM Color Jet — 80 column $645
IBM QuietWriter II- 60cps, 132 col.Call
IBM Wheel Printer — 25cps, 132 colCall



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P341 — Like P351 but slower . . $935
P1340, 192cps, 80 Col., 24-pin . .$425
Bi-directional Tractor $195

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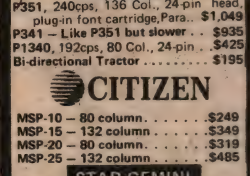
MSP-10 — 80 column. $249
MSP-15 — 132 column $349
MSP-20 — 80 column. $319
MSP-25 — 132 column $485

STAR GEMINI

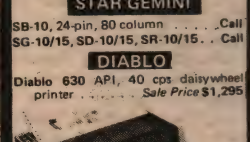
SB-10, 24-pin, 80 column . . . . .Call
SG-10/15, SD-10/15, SR-10/15. . Call

DIABLO

Diablo 630 API, 40 cps daisywheel printer . . . . . *Sale Price* $1,295



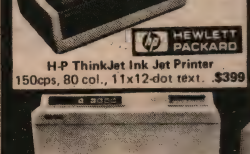
H-P ThinkJet Ink Jet Printer
150cps, 80 col., 11x12-dot text. .$399



H-P LASERJET PRINTER
300cps, quiet operation, serial. $2,395
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Canon Laser Jet A-1, comes w/4 fonts, downloadable to 20 fonts max. IBM compatible, parallel . . . $1995



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TwinWriter — Two heads are better than one! 160cps dot matrix and 36 cps daisywheel combined into one printer. Parallel interface . . .$985
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DM-40 — 160cps, 24-pin dot matrix, 136 col., with tractor, para $925

FORTIS — *by Brother*

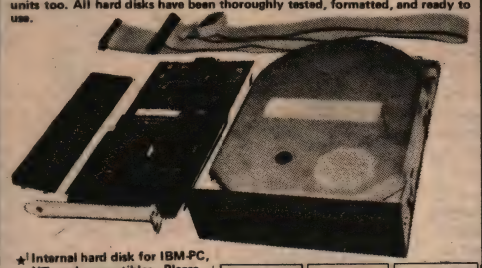
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Fortis DM-20 — 160 cps dot matrix, 136 col., NLQ mode, both parallel and serial interfaces. $525
Fortis DX-25 — 25cps daisywheel, 132 column, 7K buffer, quiet operation, built-in parallel & serial. . . . . Call
Fortis DH45 — Dual head printer, 160 cps dot matrix, 36 cps daisywheel, Epson, Diablo compatible . . $985
Tractor for 15XL/HR-25. . . . .$119
Keyboard for 15XL. $149
Cutsheet Feeder for HR-15/25 . .$189
SF-200 Feeder for DM-40/2024L .$275

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KX-P1092 . . . . . $345
KX-P1093 . . . . . $425
KX-P3151 . . . . . $405

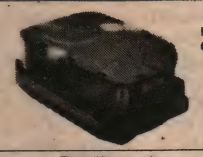
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★ Compact, half height units.
★ Famous brands
★ Complete with controller card, cable & mounting hardware.
★ Boots directly from hard disk.
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10-MB	20-MB	30-MB
$369	$445	$649
Seagate/ Tulin/ MicroScience	Seagate, MicroScience	Tulin



HARD DISKS FOR IBM-AT

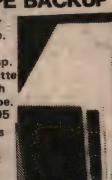
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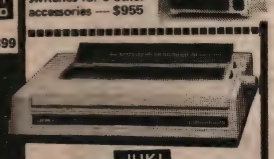
IRWIN 10-MB TAPE BACKUP

Internal half height unit. Direct connects to floppy controller card without taking up a slot. Complete w/$30 tape, software and instruction. $449

EVEREX

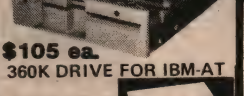


EVEREX 20-MB Internal Tape Back-Up for PC and XT, 4 MB/minute transfer rate. Complete w/control card, cable and manual $695
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6100 — 18 cps, 13" platen, 2K buffer, buffer, parallel. $379
6300 — 40 cps, 132 col., 3K buffer $689
Tractor $119



$105 ea.
360K DRIVE FOR IBM-AT



NEC

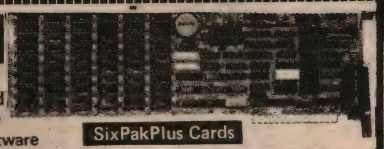
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Bernoulli Box, 10+10-MB . . . $2,325
Bernoulli Box, 20+20-MB . . . . . Call
Non-bootable interface card . . . $105
Bootable interface card. $229
10-MB Cartridge. $50
20-MB Cartridge. $60

AST

Cards for IBM PC and XT w/Free Sidekick software



SixPakPlus Cards

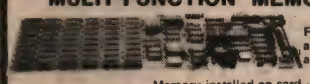
Memory installed on card	64K	128K	192K	256K	320K	384K
with paralle, serial ports & clock	$219	$229	$239	$249	$259	$269
above plus game port	$254	$264	$274	$284	$294	$304

Advantage Card for IBM-AT — *128K* - $399 *256K* - $429 *384K* - $459 *512K* - $515 *1-MB* - $565 *1.5-MB* - $615

ADVANTAGE PEGGYBACK *512K* - $215 *1-MB* - $265 *1.5-MB* - $315

RAMpage Card for IBM-PC/XT — *256K* - $325 *2-MB* - $595
RAMpage Card for IBM-AT — *512K* - $495 *2-MB* - $659

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Fully compatible with IBM-PC and XT. Comes with Ram disk and print spooler software.

Memory installed on card w/parallel,serial,game ports,clock	0K	256K	384K
	$99	$139	$159

intel ABOVE BOARDS

	64K	256K	2-MB
FOR IBM-PC/XT	$325	$399	$795
	128K	512K	2-MB
FOR IBM-AT	495	$595	$895



Special Purpose Cards

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Sigma 400H Color for PGS SR-12 $455
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Ultra Pak by Tzeng Lab $485
Tecmar Graphic Master. $465
Tall Tree J-Diskette Controller to hook up 1.2-MB drives in PC/XT . .$229
Floppy Disk Controller with parallel, serial, game ports and clock . .$145



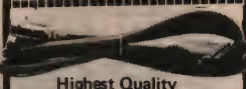
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Reflex $57
Side Kick. $49
IBM Top View. . . . . .Call
IBM DOS 2.1 or 3.1 . . . .$69



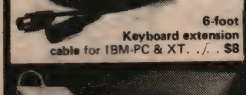
Modem Sale!

Hayes 300, external, 300 baud . $145
Hayes 1200, external, 1200 baud $365
Hayes 1200B, internal w/software $339
Hayes 2400, external 2400 baud .$579
AST Reach, 1200 baud internal .$435
Watson Voice/Data Modem . . . . Call
Watson VIP $275
Prometheus 1200 external $295
Prometheus 1200B internal $265
Everex 1200B internal modem . . $225

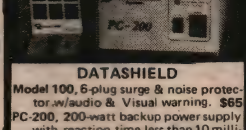


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These cables are the very best money can buy. Lifetime warranty. List $65.
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Model 100, 6-plug surge & noise protector w/audio & Visual warning. $65
PC-200, 200-watt backup power supply with reaction time less than 10 milli-sec. Built-in surge protector . $279
XT-300, above but 300-watt. . . $365
Turbo-350, Super fast 350-watt. .$535
AT-500, above but 500-watt. . . $625
AT-800, above but 800-watt. . . $685



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High efficiency switching power supply, Built-in EMI filter, over voltage & short current protection. 115/230VAC jumper selectable. 100% thermal cycle and burnt-in. Has additional outlet for hard disk or tape backup unit.

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PC-25 Copier — Make copies up to legal size from original as big as 10x 14. Enlarge 120%, reduce 67% or 78% . . . . . ($1,395) $859
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Intel 8087-3 high speed math co-processor $135
8087-2 chip for Compaq DeskPro $155
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SPEED UP YOUR PC/XT NOW
with NEC V-20 processor chip. Direct replacement of the 8088-3 chip.
Now $49



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640K memory, 1 floppy drive, serial & parallel ports, clock, Monochrome and RGB color ports, keyboard . . .$1550
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Taxan 620 RGB Color Monitor . $429
Taxan 630 RGB Hi Res. monitor.$495
Taxan 640 RGB Hi Res. monitor .$549

★★★ GREEN SCREEN ★★★

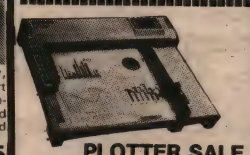
Taxan 121, 12" green, 1000x360 dots, TTL monochrome $155
Quimax DM-14G — 13" green TTL, 750x350 resolution, tiltlt & swivel base included. 1 yr. warranty $155
Taxan 115, 12" green composite .$125
IBM Monochrome, 12", 720-dot .$255

★★★ AMBER SCREEN ★★★

Amdek 300A, 12" amber $149
Amdek 310A, 12" amber, 900 dots, non-glare screen, runs off IBM monochrome interface board .$169
Quimax DM-14A — 13" amber TTL, 750x350 resolution. Tilt & swivel base included. 1 yr warranty.$159
Princeton MAX-12, 12" amber, 720 x 350 dot, runs off IBM monochrome display adapter $169
Taxan 122, 12" amber, 1000x360 dots, TTL monochrome $159
Taxan 116, 12" amber composite $129

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Roland MB-142, 14" reversible black & white TTL monochrome monitor w/ super hi res. 720x350 dots. . $269



PLOTTER SALE

ROLAND

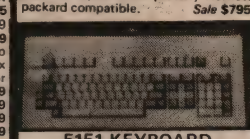
DXY-800 — 8-pen, hi-speed 180mm/sec. IBM compatible. 11x17" paper . .$Call
DXY-880 — Similar to 800, 8-pen, Hewlett Packard compatible. . . .$Call
DXY-980 — above but w/digital display & electro-static paper holder. . Call

HEWLETT PACKARD

7470A — 2-pen, 8½x11 paper size $899
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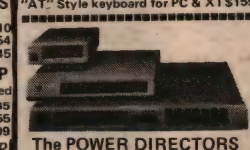
TAXAN

710S — 6-pen color plotter, Hewlett packard compatible. *Sale* $795



5151 KEYBOARD

A quiet, soft-touch keyboard for IBM PC, XT or Compaq Desk-Pro. . . $99
"AT" Style keyboard for PC & XT$159



The POWER DIRECTORS

P-22 — A unique control center & surge protector w/4 lighted and a master switches for computer, printer and accessories. It also filters out EMI & RFI interferences $79
P-2 — like P-22 but w/5 switches .$109
P-12 —Has 6 switches & clock . . .$149

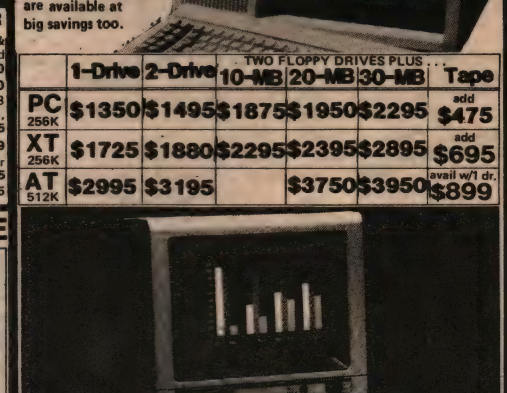
IBM PC XT AT

SALE PRICES

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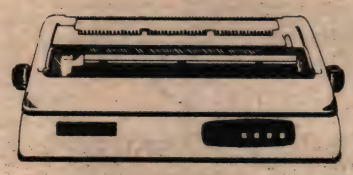
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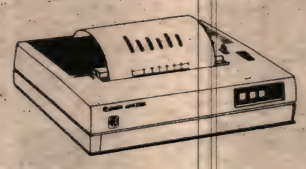
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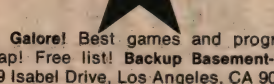


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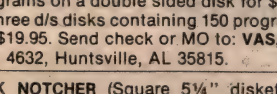
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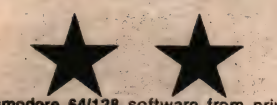


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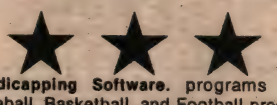


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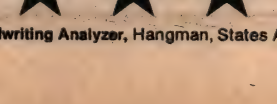
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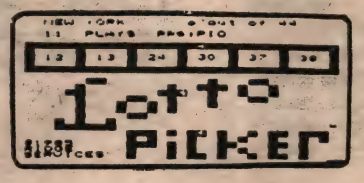
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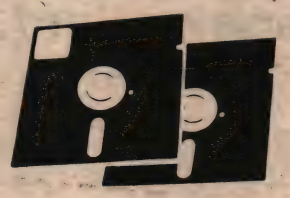
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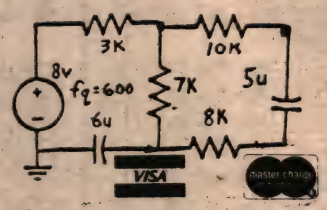
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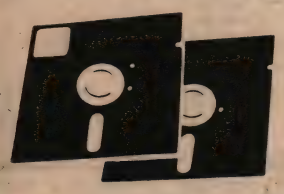
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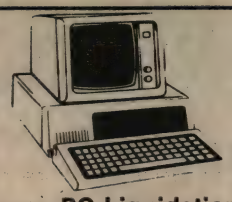
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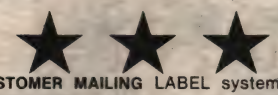
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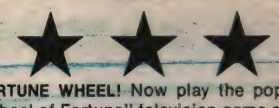
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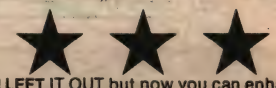
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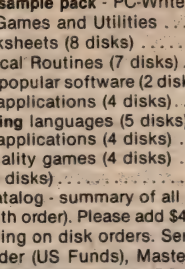


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Correctstar (updated Spellstar) -corrects spelling from 65,000 word dictionary; offers alternative words. Just type a word the wat it sounds and Correctstar will find the correct spelling. (Note: program requires 192k RAM). **Starindex**- creates an alphabetized indices and tables of contents: **Mailmerge**-merges files for personalized form letters; assembles mailing labels. Starindex- list price is $99, our price is $75 (25% off); Mailmerge-list price is $99, our price is $75 (25% off); Correctstar-list price is $145, oru price is $75 (64% off); Package of Mailmerge and Starindex-list price is $198, our price is $99 (50% off). Package of Correctstar and Srarindex or Correctstar and Mailmerge-list price is $243, our price is $99 (60% off). All three packages-list price is $343, our price is $119 (65% off). Call **BCE,** 7 days a week, 24 hours a day. **1-800-545-7447.** See ad index for other **BCE** bargains!

BERNOULLI BOX 20 MEG IBM
$1995.00
CONTACT LANNY ROSS
P.O. BOX 3207
SCRANTON, PA 18505 4-77



GOOD LUCK FROM MR. Z.

FANTASTIC DAILY NUMBER FORECASTER!
Guaranteed Winners or Money Back! Picks up to 3 STRAIGHT WINNERS most every week, playing 1 to 3 a day! Apple, IBM, C64, Atari, 1 drive. Many reports of hitting for THOUAND. Send SASE for info. $99.95 on disk only to: **Z-Way,** PO Box 9017, Canton, OH 44711. Publications3-76



Picture Editor for altering processed images or creating new images. All alphanumerics, geometrical shapes, fill etc. $19.95. Image processing package for image enhancement, computer art, graphics etc. Includes test images $39.95. Printer and pitcture database demo package for MC-80 and color display $6.95. Minimum system: 256k, color card and 1 disk drive. Pictures digitized from photos at $.50 each plus $3 per disk. Additional $.50 processing charge per photo to view image using color display. Video/Audio digitizer available soon. Call or send for details. **419-382-0079. ImTek,** 1460 Eastgate Rd., Toldeo, OH 43614.

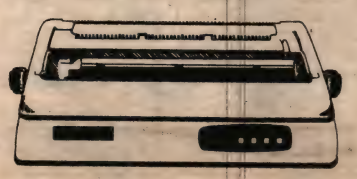
For an offer you can't refuse...
GODFATHER'S used computer SYNDICATE

MILLION $$ JACKPOTS! LOTTO! PICK-4! Your **IBM, C64,** or **TI99/4A** can unlock the winning combinations for you! Every U.S. and Canadian game included! Expandable! **$29.95. ORDER 1-800-341-1950 Ext. 77.** By Mail: **RIDGE,** 170 Broadway, #201-CS, New York, NY 10038. Write for Free Catalog.2-78.

For an offer you can't refuse...
GODFATHER'S used computer SYNDICATE

$$$$ New Human Edge software at an incredible price!!! Retails for $250 --- Wholesales for $150 = * = * = * = Our price only $49 delivered!! For sales edge, negotiation edge, communication edge, or management edge from the folks who brought you MindProber!!!!!!!!! In original wrapping. **Godfather's Used Computer Syndicate,** PO Box 3037, 1154 W. SR 436, Forest City, FL 32714. **305-774-1111.** 3-76

Printer Liquidation!



40 CPS Wide Carriage, Daisy

Wheel, Letter Quality Printer

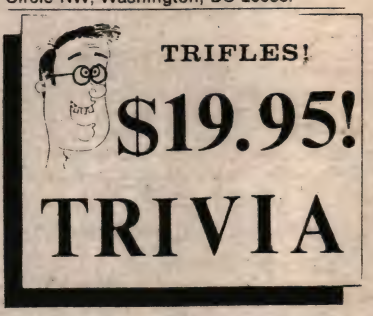
80% OFF

$349

C. Itoh model F10-40 (made for Commodore)- Diablo 630 compatible, 40 CPS, centronics, parallel interface, 2K buffer, bidirectional, optional sheetfeeder and tractor feed. For more information on this and other super bargains, see ad index for **BCE** display ads.



Toy Box "I love it, your kids will too!" Ages six months and up. Three dimensional color graphics fun. Each key creates a new effect. Worlds, stars, cubes and more! Play "name that tune" with 20 melodies. Also makes your keyboard a piano™, XT™,AT™, Jr.™, and compatibles. $7.50 postage paid. **Moss Works,** #421 One Scott Circle NW, Washington, DC 20036.



Versatile Trivia - Can be played similar to popular game who, "Wheel of ?????", or use gigantic trivia file included. great for educators!! Included in motor to expand or create your own game. IBM PC or compatible. list $39.95 - SALE $19.95 + $1.00 postage. **MCS,** Box 1917, Kettering, OH 45429. 4-80

MS-DOS SOFTWARE 1 Microsoft basic compiler $50, 1 Borland Sidekick $25. 1 dBase III $250. **Richard Seale,** 303-449-4897/ 443-4681. 4-76

MUSIC LIBRARY

The CyberTools Music Library for $30 consists of over 140 files of PC music and sounds that can be incorporated into your programs. Don't waste time programming music; use tunes from our library to enhance your programs. Includes an Organ Synthesizer, a music composition system plus a JukeBox program. **Send $3 cash fro 20 page Catalog** or SASE for price list. **CyberToolWorks, Box 4143, Huntsville, AL 35815 or call 205-880-2250.** 3-75

★ ★ ★

PAYCHECK Payroll Program. Prints checks and keeps track of employees, wages, salaries, tips for restaruants, and all taxes for the week plus year and quarter totals! $59.95 includes shipping. **Micronics Technology,** 449 Barbados Way, Niceville, FL 32578 **904-897-4257.**

PC/XT Motherboard, 8 slots, 256K RAM, BIOS & Basic ROMS, $249 plus shipping. **Nexo Distribution,** 8824 Golf Drive, Spring Valley, CA 92077. **619-589-7928.** 4-77

★ ★ ★

PERFECT PRINTER. Use your printer like a typewriter. Immediate and buffered modes (correct before you print). $19.95 includes shipping. **Micronics Technology,** 449 Barbados Way, Niceville, FL 32578. **904-897-4257.**

PERSONAL COMPUTER USERS TAKE NOTES: 1000+ Public Domain Software Disks and hardware peripherals for IBM-PC, Apple, Commodore, CP/M Computers. Send for Free Catalog. ACT NOW!!! **Pan World International,** 422 Halsey Road, North Brunswick, NJ 08902. 3-85

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* PROBALOTO *

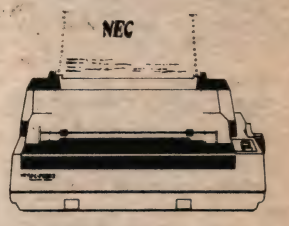
The probability lottery program. Select numbers weighted towards the most or least picked or random, Pick 3&4 too. See review in the October issue of Rainbow Magazine or January issue of Computer Shopper, page 60. Versions for MS-DOS (IBM, AT&T, TANDY 1000 etc) and CP/M Computers on disk, Only $29.95. **Gary Olander,** 322 Haymarket Pl., Gahanna, OH 43230. 3-77

PUBLIC DOMAIN SOFTWARE. 100s of programs for small copy charge. Games, financial, databases, utilities, etc. Big catalog for IBM, MS-DOS $1 (refundable). Also Sanyo MBC 55X catalog ($1 refundable). **Software Library,** POB 204, Prosser, WA 99350.

Parallel Printer Attachment (sidecar) for PC Junior. Genuine IBM product. Perfect Condition. Cost $99, sell for $65 (firm). **Gary Smith, 615-885-3831,** after 6pm CST, no collect calls.

Perfect Software: writer/speller/calc/filer. Plus fast graphs, MS DOS 2.0, home accountant plus and TIM IV (originally $495) list for Tim IV. All software Columbia version, Never Used, $175. **212-920-1124 ask for Tim.**

Printer Liquidation!



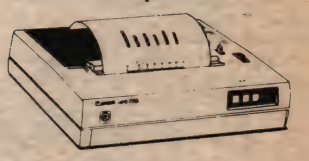
NEC NLQ Printer

70% OFF

$149

NEC-PC-PR103A-near letter quality dot matrix, 80 characters per line, 92-110 cps draft mode, 46 cps near letter quality, frictin and tractor feed, centronics, 8-bit parallel interface, 10" carriage. For more information on this and other super bargains, see ad index for **BCE** display ads.

Printer Liquidation!



Canon Color Ink Jet Printer

72% OFF

$199

Canon PJ 1080A Ink Jet printe-37cps, 640 dots per line, 7 striking colors, can be used for overhead projections. Works wil all standard IBM graphics packages. For more information on this and other super bargains, see ad index for **BCE** display ads.

Public Domain PC-Sig 423 volumes, PC-blue 154 volumes, Apple. $3.50 per disk. Volume discount sell or rent. Send SASE for list. **World Media,** 4232 Balboa, San Diego, CA 92117. 3-77

Public Domain Software: for IBM PC & PCjr. Word processors, graphics, games, data programs and much more. Send for list. $3 per disk. **JDX DISK COPY SERVICE,** PO Box 1561, Corona, CA 91718. 4-76

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RENT $20/MONTH visicalc, multiplan, dbase, lotus, multimate, cobol, pascal, fortran, pl/I, c compiler, games, chess, sargon, frogger, crossfire, flight simulator. **JVC Computer,** 142-15 Cherry Ave., Flushing, NY 11355. **Telephone 718-539-7741.** 3-79

RENTAL MANAGEMENT, small business and utility monitoring programs our specialty. IBM-Commodore only. **Fabtronics,** 51 Quarry St. Brockport, NY 14420. 11-75

RENT AND COPY IBM PUBLIC DOMAIN

4000 + PROGRAMS

ON 390 VOLUMES-RENT AND COPY FOR $1 per volume or we copy -$3 SSDD, $6 DSDD! Sampler $5! Directory (2) disks $7. Mastercard, VISA! Recorded info/order **619-941-3244** (anytime) or LSASE (specify computer): **Futuresystems,** Box 3040(C), Vista, CA 92083.

Real Estate software mortgage payments, amorization, depreciation, cash flows, tax consequences, all for $35 PP. **215-398-0434.** 2-75

Reflex by Borland International, only $79; ORDER NOW! Modem with software $64.97; COMPUSERVE starter kit $25.97; PRICES INCLUDE SHIPPING. To order send payment or call. PA residents add 6% Sales Tax. VISA/Mastercard accepted. **Seneca Software,** 1104 Seneca Drive, RD #2, Harmony, PA 16037. **412-452-8418.**

SED - SCREEN EDITOR. Loads ANY file! Use to write programs or edit non-text files. Makes use of all the IBM screen characters. Has advanced features like key macros, search & replace, 5 block commands. Great for writing in Pascal, Basic, C, and machine language. Can also edit non-text files and show you what they REALLY look like! requires IBM or compatible, MS-DOS version 2.0 or later. Costs only $19plus $2 shipping. See our ad in the Showcase section (under Computer Shopper Mart). Call for our flyer. **DISC,** 1725 K Street NW, Suite 611, Washington, DC 20006, Phone **202-785-8585.** 4-76

SMALL BUSINESS PAYROLL program for Multiplan or Supercalc 3. Handles up to 10 employees. All standard payroll periods available. $49.95. Specify payroll periods and spreadsheet. **Micro Insight,** Box 2033, Universal City, TX 78148. 1-75

SPL a modeling language, spread sheet and word processor in one easy to use package. At Beta test level. Requires 256k, printer DOS 2.0 + $35 pp. **Cazier Software Designs,** 6616 E. Desert Cove, Scottsdale, AZ 85254. 4-76

STOCK CHARTING/ANALYSIS IBM PC/Z100 advertised in Wall Street Journal. For serious investor. Fast charting and volume analysis package. Visa, M/C $59.95. Discount Disks **904-651-4550.** 1-75

Smart System integrated software: spreadsheet, data manager, word processing, communications. All original manuals and diskettes. One only at $100 Call **502-782-4016** or write **Computer Solutions,** Box 3440, Bowling Green, KY 42102.

★ ★ ★

Sophisticated, easy to use input routine ready for use in your IBM BASIC programs. Prevents program interruptions from bad input and prevents user from keying over input fields. Source code provided via diskette. $6 postage paid. **Customized Software, Inc.,** PO Box 6992, Tyler, TX 75711.2-75

TAX INSIGHT 85 Personal income tax program. Includes 1040, A, B, E, W, SE, D, C, 2119, 2441, 3903. $49.95, Specify Lotus 123, Supercalc 3, or Multiplan. **Micro Insight,** Box 2033, Universal City, TX 78148. 1-75.

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THE PRIVATE LINE™

PC/MS-DOS COMMUNICATIONS SECURITY

$49.95

Encrypts text, data, & programs. Uses US Government Data Encryption Standard (DES). Converts encrypted data to ASCII for use w/tele-communications sys such as Easylink & MCI Mail & bulletin boards like Compuserve. Supports pathnames & double encryption - 1 or 2 64 bit keys. Displays, prints, & purges files. IBM PC & Compatibles w/MS-DOS 2.X & up-CP/M Version available ($29.95). With 40-page User Manual. Not Copy Protected. Site Licenses avail. Licensee Inquiries Welcome. **Everett Enterprises,** PO Box 193, Bath, NC 27808. **919-923-5621.** Telex II: 5101011171. CompuServe: 70320,107. 3-78

Telpac Communications software $50. Dow Jones Market analyst $95. Concurrent CP/M $100, DR Draw $100. **Len 212-777-4353.**

The Good Word

NEW! NEW! Get THE Good Word! Don't joke around. Start your day with a meaningful **Bible** message. The Good Word produces a different reading each day for one year. Each day's passage is revealed following system boot or whenever you enter the command GOODWORD. For PC, XT, Jr. and compatibles. Order Today. **FREE** Calculator software included. Send $24.95 to **Computer Customware & Consulting,** 3911 Fain Court, Montgomery, AL 36109. 2-75

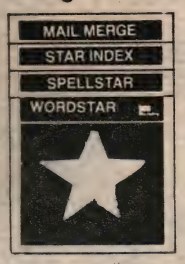
WHY PAY DOUBLE? diskfulls software (DS/DD) for PC/Clones - Rent $1 - buy $3 (including disk). **804-851-6864, Colony,** Box 808, Langley AFB, VA 23665.

Wordperfect IS PERFECT. Wordperfect version 4.1 in mint condition $150 firm. I will pay UPS shipping & insurance. **Ed Schneider,** 28 Orchid Road, Levittown, NY 11756. Please call between 10 am & 8 pm EST. **516-796-8825.**

WordStar Professional



• WordStar • SpellStar • MailMerge • StarIndex



+

Appli-Card CP/M Board



For Apple II, IIe, II + $169

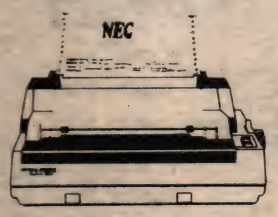
The package includes **Wordstar** version 3.3, Spellstar mailmerge, and Starindex. Also included : **an Appli-Card CP/M board** (made by PCPI, _so sold as Starcard). Runs CP/M 2.2, Z80B, 6 MHz, 70 column display without 80 column card (80 column display with 80 column card). One year manufacturers warranty. **Wordstar Professional and Appli-card** -list price is $870, our price is $169 (80% off). **Wordstar Professional** - list price is $395, our price is $139 (65% off). **Appli-Card CP/M Board** -list price $475, our price is $119 (75% off). Quantities are limited: to order call **BCE,** toll free 7 days a week, 24 hours a day. **1-800-545-7447.** See ad index for other super BCE bargains!

(116) NEC COMPUTERS FOR SALE

NEC-APC, 384Kb., monochrome w/graphics, 2x8"drs, MS-DOS C/PM-86 CC/PM-86 P-system, w/cables, accessories, WordStar, SuperCalc 2, dBase II, various software $1500. Cables. **James Thompson,** 2540 Booker Creek Rd., Chapel Hill, NC 27514. 2-75

NEC PC-8001 system includes FDC I/O port PC-8031 disk drives REN-TEC wedge 64k and assorted software utilities, games, business, CP/M $700 or best offer. Call **David Beech, 206-473-4803** or write: 6109 S. I Street, Tacoma, WA 98408.

Printer Liquidation!



NEC NLQ Printer



$149

NEC-PC-PR103A-near letter quality dot matrix, 80 characters per line, 92-110 cps draft mode, 46 cps near letter quality, friction and tractor feed, centronics, 8-bit parallel interface, 10" carriage. For more information on this and other super bargains, see ad index for **BCE** display ads.

(116A) NEC COMPUTERS WANTED

NEC-APC, NEC-3530 SpinWriter, NEC-P5, Epson LQ1500 wanted in running condition. **201-757-2839,** Box 187, Newark, NJ 07060. 3-77

(116B) NEC SOFTWARE, PERIPHERAL

NEC PC-8201A-Send for free catalog of compact affordable software. **CSA Software,** PO Box 22261, Chattanooga, TN 37422.01-75.

PUBLIC DOMAIN PC-8000 software. 95 CP/M and NBasic disks, $4 each. Send SASE for catalog. **Long Island NEC Users Group,** 75 Weaving Lane, Wantagh, NY 11793. 2-78

(117) OHIO SCIENTIFIC

OHIO SCIENTIFIC C1P w/manuals and tape cartridge, $50. **Richard Seale,** 303-449-4897/443-4681. 4-76

OSI C4P-MF system. Includes 24k RAM, RS232, Home control port with DOS 3.2, DOS 3.3, plus over 10 disks of software. Good condition $450 takes all. Call **Walt Hendrickson, 213-532-0614** evens. or **213-533-8323** days.

(117A) OHIO SCIENTIFIC COMPUTERS WANTED

(117B) OHIO SCIENTIFIC SOFTWARE, PERIPHERAL

(118) OSBORNE COMPUTERS FOR SALE

... For an offer you can't refuse ...
GODFATHER'S used computer SYNDICATE

$$$$ I have Osborne computers for sale with 90 day warranty. Used-$500, New-$600, we also do upgrades. **Godfather's Used Computer Syndicate,** PO Box 3037, 1154 W. SR 436, Forest City, FL 32714. **305-774-1111.** 3-76

NEW Osborne MS-DOS SYSTEMS! Model 2100w/ Monochrome monitor, 2 floppy drives, MS-DOS 2.11, parallel card V20 (CP/M Software!) $1995. **Model 2110 w/Monochrome** monitor, 1 floppy drive, MS-DOS 2.11, Parallel Card, 10-Meg HD, V20 (Runs CP/M software!) $2495. **Model AT w/Mono Monitor,** 1- 1.2 meg floppy, Parallel Card, 512K, $2995. **Model AT-20 w/Mono Monitor,** 1- 1.2 meg floppy, Parallel Card, 512K, 20-meg HD $3995. Semi-kits Available- Trade-ins Accepted! Authorized Osborne Dealer! Visa/MC. **B Systems,** 3228 S. Boulevard, Suite 577, Edmond, OK 73013. **405-341-7437.**

OSBORNE: Buy-Sell-Trade Computers, parts, accessories, and software. **TTM Inc.,** PO Box 8256, Brownsville, TX 78521. 512-831-9341. 4-77

(118A) OSBORNE COMPUTERS WANTED

... For an offer you can't refuse ...
GODFATHER'S used computer SYNDICATE

$$$$ I Buy, Sell, & Trade Osborne computers working or not. We also do upgrades. **Godfather's Used Computer Syndicate,** PO Box 3037, 1154 W. SR 436, Forest City, FL 32714. **305-774-1111.** 3-76

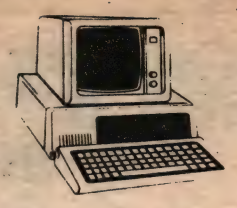
Paying $5.00 per pound for scrap tantalum capacitors. Any amount, fast payment! Ship: **Sciuto,** 103 Saratoga St., Lawrence, Mass. 01842. 9-79

(118B) OSBORNE SOFTWARE, PERIPHERAL

FREE OSBORNE software available through the Public Domain Users Group. Over 200 programs: games, (adventure, chess), utilties & specialty (Modm7, Database). For information send SASE to: **Public Domain Users Group,** PO Box 1442-C8, Orange Park, FL 32067. 1-75

(120) MS/DOS COMPUTERS FOR SALE

768Km 2 Disk, 8 MZ PC by Zenith, runs IBM software, with monitor, NLQ printer, DOS, and intergrated software (INTUIT or JACK). Retail over $2800, yours for just $1499.95, COD frt collect or prepay frt prepaid. **Computers & More,** 2400A Ave I, Huntsville, TX 77340 **(409)291-0065** Z-148-42, 1220/1230, Star SG-10, all cables, etc.



Cornoa PC Liquidation

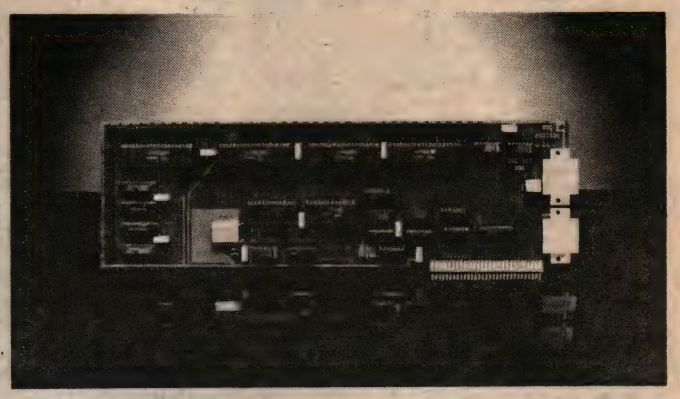
$849

100% IBM compatible!

Olivetti model number M18-DT2 (same as Corona)- 128k installed on the motherboard

HOW TO PUT YOUR IBM-PC TO WORK IN THE "REAL-WORLD"

(First, Buy This Board!)



96 TTL I/O PORTS FOR THE IBM-PC

The Model 1018 Multi-I/O Board for the IBM-PC: ICD has packaged **96** Input-Output Channels onto a single full-length board for the IBM-PC, XT, and buss-compatibles. This high-density TTL-level I/O board can be used to monitor switches and sensors, control relays, motors, even drive low-current LEDs directly! Simply instruct the on-board PIO (parallel input-output) circuitry to sense or output +5 Volt signals in groups of 8 (making 12 groups possible). An additional 48 TTL Inputs and 2 RS-232C Serial Ports provide unprecedented capability on a single board! Optional 64-pin header connectors with attached ribbon cables will plug directly onto the board, available in 4, 10, and 20-foot lengths. Ideal for many OEM, VAR, and computer enthusiast uses in process monitoring and control, energy management, security, home control, and other "Real-World" applications! Includes sample application software listings for the PC, pinout diagrams, and handy "channel assignment" sheets.

- 12 Eight-Bit Parallel TTL-Level I/O Ports Utilizing 8255 PIO Devices
- 4 Eight-Bit Parallel TTL-Level Input-Only Ports
- 2 RS-232C Serial I/O Ports with Jumper-Selectable Baud Rates (110 Baud to 19.2K Baud)
- Crystal-Controlled Communications Timing
- High-Current Serial Output Option
- Hardware-Selectable Base Address (allows multiple board use)
- Occupies One Full-Length IBM-PC Expansion Slot

1018 PC-I/O BOARD $495.00. Now available through ICD Products Dealers and Representatives Worldwide.

More ICD "Real-World" Computer Interfacing Products:

RTS-1	Remote Temperature Sensor
RLS-1	Remote Light Sensor
RMS-1	Remote Moisture Sensor
RSDA-1	Remote Smoke Detector Alarm
HVAC-1	Remote HVAC Controller Module
ADV Series	Remote-Controlled Air Duct Valves
S-100	Analog I/O and Calendar/Clock Boards

FOR MORE INFORMATION: SIMPLY MAIL THIS AD WITH YOUR BUSINESS CARD OR PRINTED NAME & ADDRESS TO ICD AT THE ADDRESS GIVEN BELOW, OR CALL (818) 889-3179, M-F, 8AM TO 5PM, PST.

SPECIAL OFFER! PURCHASE ICD'S POPULAR BOOK, "HOW-TO" APPLICATION NOTES, AT 25% OFF THE COVER PRICE — SIMPLY ENCLOSE THIS AD & CHECK OR MONEY ORDER FOR $18.75 + $2.00 S&H (ALASKA & HAWAII $3.50 S&H). ALLOW 2-4 WEEKS FOR DELIVERY.

Industrial Computer Designs

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(818) 889-3179

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Broderbund *Choplifter*	19.00*
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CBS *Mastering the GRE*	53.50*
CBS *Murder by the Dozen*	20.97*
CBS *Goren Bridge Made Easy*	45.00*
Counterpoint *The News Room*	26.97*
Davidson *Speed Reader II*	36.50*
Davidson *Math Blaster*	26.50*
Davidson *Word Attack!*	26.50*
1st Byte *Smooth Talker-Mac Only*	47.00*
Hayden *DaVinci-House/Interiors/Landscapes*	24.75*
Hayden *Sargon III*	25.75*
Infocom *Deadline or Suspended*	24.00*
Infocom *Enchanter, Planetfall Cutthroats, Witness or Zork I*	20.00*
Infocom *Hitchiker's Guide or Seastalker*	20.00*
Infocom *Suspect, Sorcerer or Infidel*	22.00*
Infocom *Zork II or III*	22.00*
Layered *Front Desk-Mac Only*	65.00*
Mirage Concepts *Trivia*	11.00*
Miles Computing *Mac Attack-Mac Only*	$23.00*
Palatir *Mac Type-Mac Only*	23.50*
Penguin *Graphics Magician*	28.97*
Penguin *Pensate or Xyphus*	20.00*
Penguin *Transylvania-Mac Only*	20.00*
Professional Software *Trivia Fever*	19.00*
Pryority Software *Forbidden Quest*	21.00*
Scarborough *Master Type*	26.50*
Scarborough *Run for the Money*	26.00*
Simon & Schuster *Typing Tutor III*	28.25*
Sir-Tech *Wizardry*	26.97*
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Sir-Tech *Rescue Raiders*	18.97*
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▶**Spinnaker** *Alphabet Zoo, Face Maker, Kinder Comp, Hey Diddle Diddle, Rhymes & Riddles, Story Machine*	15.97*
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Videx *Fun Pack-Mac Only*	19.77*
Videx *Mac Checkers & Reversal*	25.17*
Videx *Mac Vegas-Mac Only*	31.00*
Virtual Combinatics *Micro Cookbook*	21.00*

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(Please add $2.50 shipping and handling for each title ordered from below.)

▶**Apple** *Apple Works*	$160.00*	▶**Microsoft** *Word for Macintosh*	$102.00*
Borland International *Turbo Pascal*	30.00*	▶**Microsoft** *File for Macintosh*	102.00*
BPI *GL, AP, AR, PR, or INV*	205.00*	▶**Microsoft** *Multiplan for Macintosh*	102.00*
Broderbund *Bank Street Writer*	40.00*	**Microsoft** *Basic for Macintosh*	79.00*
Central Point *Copy II Plus or Copy II Mac*	20.00*	**Microsoft** *Chart for Macintosh*	66.00*
Funk Software *Sideways*	32.00*	**Monogram** *Dollars & Sense for Apple II*	55.00*
Funsoft *Macasm*	60.00*	**Monogram** *Dollars & Sense for Macintosh*	70.00*
Haba *Habadex*	40.00*	**Odesta** *Helix for Macintosh Reg's 512K*	200.00*
Haba *Quartet*	97.00*	**Provue** *Overvue-Mac Only*	135.00*
Harvard *Mac Manager*	29.95*	**Sensible Software** *Sensible Speller IV*	67.50*
Human Edge *Mind Prober*	24.00*	**Softcraft** *Fancy Fonts*	125.00*
▶**Human Edge** *Sales Edge*	110.00*	**Softech Microsystems** *UCSD Pascal*	37.00*
Human Edge *Communication Edge*	98.00*	**Software Arts** *TK Solver! for Mac*	134.00*
▶**Living Videotext** *Think-Thank-Mac Tool*	65.00*	**Software Publishing** *PFS: File, Write, or Graph*	68.00*
Main Street *Filer-Mac Only*	67.00*	**Stoneware** *DB Master-Mac Tool*	95.00*
MECA *Managing your Money*	87.50*	**Telos** *Filevision for Mac*	87.50*

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DISK DRIVES

	Wholesale	
Alps *AP-100A Dual Apple Drives in One Case*	$309.00*	(7.00)
▶**Alps** *AP-100C Slimline Drive in Case*	159.00*	(4.00)
Apple *MAC 400KB External Drive*	349.95*	(7.50)
IOmega *Macnoulli 5MG Removable Drive for Machintosh*	1,250.00*	(27.00)
Micro Sci *A2 143KB Drive Just like Apple's Own*	150.00*	(5.00)
Micro Sci *Floppy Controller*	55.00*	(2.50)
▶**Paradise** *Mac 10MB Hard Drive Subsystem*	750.00*	(16.20)
▶**Paradise** *Mac 20MB Hard Drive Subsystem*	950.00*	(20.52)
▶**PC Network** *140K External Drive for Apple IIc*	95.00*	(2.50)
Rana *Elite I 163K Drive*	225.00*	(5.00)
Tecmar *5MB Removable Drive for MAC*	999.00*	(21.58)
Tecmar *10MB MAC Drive*	999.00*	(21.58)
Tecmar *5MB MAC Drive Upgrade*	1,235.00*	(26.68)

BOARDS AND BUFFERS

ALS *Z-Engine*	$115.00*	(2.50)
AST™ *Multi I/O—2 serial/Clock*	155.00*	(2.50)
Microsoft *Premium Softcard IIe*	243.67*	(2.50)
Microtek *Dumpling/GX*	55.00*	(2.50)
Orange Micro *Grappler +*	66.00*	(2.50)
Orange Micro *Serial Grappler*	66.00*	(2.50)
PC Network *Z80 Card*	35.00*	(2.50)
Quadram *APIC/G Graphics Interface*	62.00*	(2.50)
Quadram *e RAM-80*	88.00*	(2.50)
Quadram *Multicore—1 Parallel/1 Serial/ Clock Expandable to 256K*	140.00*	(2.50)
Thunderware *Thunderclock*	104.00*	(2.50)

MODEMS

Hayes *Micromodem IIe w/Smartcom*	$125.00*	(2.50)
Novation *Apple Cat II*	174.45*	(3.50)
Prometheus *1200 A Low Cost 1200 Baud Internal Modem for Apple II.*	276.00*	(6.00)
Prometheus *Promodem 1200 w/Mac Pack*	299.00*	(6.00)
Prentice *Pop Com MAC Pack 1200 Baud Modem, Cable, Straightalk*	245.00*	(2.50)

ACCESSORIES

Apple *Macintosh Carrying Case*	$69.00*	(1.49)
Apple *Macintosh Security Kit*	29.00*	(1.50)
Apple *Macintosh Numeric Keypad*	69.00*	(2.50)
Hayes *Mach III Joystick w/Fire Button for IIe*	31.00*	(1.50)
Kensington *Disk Case*	20.00*	(1.50)
Kensington *Dust Cover for MAC or imagewriter*	8.25*	(1.50)
Kensington *Starter Pack*	54.00*	(3.00)
Kensington *Surge Protector*	33.47*	(2.50)
Kensington *Swivel*	21.00*	(2.50)
Kensington *System Saver Fan*	56.97*	(1.50)
▶**Koala** *MacVision*	158.00*	(3.00)
Koala *Koalapad Touch Tablet*	78.00*	(1.50)
M&R *Sup-R-Mod RF Modulation*	44.00*	(1.50)
PC Network *Cooling Fan with Surge Protector & Dual Outlets*	25.00*	(2.50)
PC Network *SSDD Diskettes (Box of 10)*	7.95*	(1.00)
PC Network *Macintosh Diskettes Includes Free Flip & File Case*	15.95*	(1.50)
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Sony *MAC Diskettes (Box of 10)*	19.00*	(1.50)

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Bluebush *Chess (Your Toughest Opponent)*	34.00*
Bluechip *Millionaire/Oil Baron or Tycoon*	26.00*
Broderbund *Lode Runner*	19.75*
CBS *Goren-Bridge Made Easy*	40.00*
CBS *Mastering the SAT*	50.00*
CDEX *Training for Word Star*	37.25*
Comprehensive *Intro to Personal Computing*	32.00*
Davidson *Math Blaster, Word Attack!*	26.50*
Davidson *Speed Reader II*	36.50*
Hayden *Sargon III*	25.75*
Individual *Professor DOS*	32.50*
Individual *The Instructor*	24.50*
▶**Infocom** *Zork I or Witness*	20.00*
▶**Infocom** *Deadline, or Suspended*	$24.00*
Microsoft *Flight Simulator*	27.00*
Mouse Systems *PC Paint—Turn your PC into A Color Macintosh!*	59.95*
Scarborough *Mastertype*	26.50*
Sierra On-Line *Crossfire*	18.00*
Sierra On-Line *King's Quest II*	27.00*
Spectrum Holobyte *GATO*	18.00*
▶**Spinnaker** *Alphabet Zoo, Kinder Comp, Story Machine, Face Maker, Hey Diddle, Diddle, rhymes & Riddles*	15.97*
▶**Spinnaker** *Delta Drawing*	24.97*
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▶**Ashton-Tate** *Framework II*	365.00*	**Micro Pro** *Wordstar 2000+*	262.00*
Borland *Turbo Pascal*	25.75*	**MicroRim** *Clout*	110.00*
Borland *Side Kick (Protected)*	26.00*	**MicroRim** *RBase 5000*	300.00*
Borland *Turbo Pascal 8087*	49.75*	**Midrosoft** *C Compiler*	220.00*
Borland *Superkey*	32.00*	**Microsoft** *Word—Latest Version 2.0*	202.00*
BPI *G/L, A/R or A/P*	305.00*	**Microsoft** *Multiplan*	101.00*
BPI *Aura*	265.00*	**Microsoft** *Mouse*	107.00*
BPI *Personal Accounting*	48.00*	**Monogram** *Dollars & Sense*	95.00*
Breakthrough *Timeline*	230.00*	▶**Multimate** *Multimate (Latest Version)*	190.00*
▶**Central Point** *Copy II PC*	20.00*	**Norton** *Norton Utilities 3.0*	46.00*
Conceptual Instruments *Desk Organizer*	157.00*	**Open Systems** *P/O Sales A/R INV G/L A/P Team Mgr.*	ea. 275.00*
Digital Research *DR Logo*	75.00*	**Power Base** *Power Base*	197.00*
Digital Research *Gem Desktop*	25.00*	**Real World** *G/L A/P A/R or OE/INV*	ea. 275.00*
Digital Research *Gem Draw*	73.00*	**Rosesoft** *Prokey Version 3*	65.00*
Enertronics *Energraphics*	155.00*	**Ryan McFarland** *RM COBOL (Dev. System)*	520.00*
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Harvard *Total Project Manager*	225.00*	▶**Satellite Software** *Word Perfect*	190.00*
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▶**Human Edge** *The Management Edge*	137.50*	**Meca** *Managing Your Money*	87.50*
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Lifetree *Volkswriter III*	135.00*	**Sorcim** *Supercalc III*	169.00*
▶**Lotus Development** *Lotus 1-2-3*	285.00*	**Xanaro** *Ability*	247.50*
MDBS *Knowledgeman/2*	295.00*		

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PC Network *AT 42MG Internal Hard Disk 35MS Access Time—Comes Complete*	1,155.00*	
PC Network *20MG Tape Backup Half Height Internal w/Controller*	495.00*	
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▶**Tandon** *TM 100-2 Full Height DS/DD Drives*	93.00*	(2.20)

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Apparat *AT Ram Expansion Card*	$139.00*	(2.50)
▶**AST™** *SixPakPlus™ With 64K*	195.00*	(2.50)
AST™ *I/O Plus II™*	120.00*	(2.50)
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▶**PC Network** *512K Memory Board w/0K*	59.00*	(2.50)
▶**PC Network** *The Multi-384 Board A clone of the AST's™ SixPakPlus.™ Includes up to 384Kb of expansion memory, 1 serial, 1 parallel, 1 game port, a clock/ calendar and software standard.*	79.00*	(1.70)
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Quadram *Improved Quadboard w/0K*	170.00*	(2.50)
Quadram *Quad Sprint Turbo Board*	360.00*	
Tecmar *Captain Multifunction Card w/0K*	146.00*	(2.50)

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Hayes *Smartmodem 1200B with New Smartcom II/VT100 Emulator*	312.00*	(2.50)
Hayes *Smartmodem 1200B Alone*	265.00*	(2.50)
Prometheus *Promodem 1200B Internal*	225.00*	(2.50)
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Hercules *Color Card w/Parallel Port*	$142.00*	(2.50)
▶**Hercules** *Monochrome Graphics Card*	263.00*	(2.50)
Paradise *Modular Graphics Card*	235.00*	(2.50)
▶**PC Network** *Hercules Mono Card Clone 100% Hercules Compatible!*	99.00*	(2.50)
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Persyst *Bob Card Ultra High Res Color*	299.00*	(2.50)
Quadram *Quad EGA + Enhanced Graphics Adapter*	340.00*	
▶**STB** *Graphix Plus II*	199.00*	(2.50)

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▶**Brand Name DS/DD Diskettes** *Guaranteed for Life! Not Generic!*	$8.95*	(1.00)
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Amdek *Video 310A IBM Type Amber*	130.00*	(3.00)
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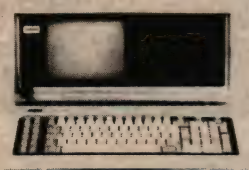
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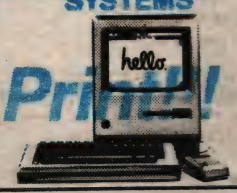
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I am under no obligation to buy anything. My complete satisfaction is guaranteed. Please check (✓) all boxes that apply:

Basic Membership With 14 Days Rental
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- ☐ Two-year membership for $15 (SAVE $1)
- ☐ Business Software Rental Library for $25 add'l. per year—with 14 day rentals
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Special V.I.P. Membership* With 30 Days Rental.
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- ☐ BOTH Business and Game Software Rental Libraries for $30 add'l. per year—with 30 day rentals

*VIP members receive advance notice on limited quantity merchandise specials

☐ Bill my credit card: ☐ VISA ☐ MasterCard ☐ American Express

Account Number: _____

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☐ Check or money order enclosed for $ _____

Name _____

Address _____ Apt. No. _____

City _____ State _____ Zip _____

Telephone ( ) _____

My computer(s) is: ☐ IBM PC ☐ IBM-XT ☐ IBM-AT ☐ Apple II ☐ Macintosh ☐ Other _____

Signature _____
(Signature required to validate membership)

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(expandable to 512K), dual floppies, seial and parallel ports, very high resolution TTL monitor (640x325 resolution), will run Lotus 1-2-3, Flight Simulator and PC DOS. Word-processing package by MicroPro including Wordstar 3.3, Spellstar, Mailmerge, Infostar and Reportstar is available for $59. For more information on this and other super bargains see ad index for **BCE** display ads.

. . . For an offer you can't refuse . . .

Godfather's used computer SYNDICATE

$$$$ Dimension 68000 runs IBM, C/PM, C/PM-80, Apple II+, Kaypro, Cromenco, Unix, and Radio Shack software. 2 DSDD drives, 512K, 8 MZ. Clock, a true programmer's machine!! $1,499. 5 day warranty. **Godfather's Used Computer Syndicate,** PO Box 3037, 1154 W. SR 436, Forest City, FL 32714. **305-774-1111.** **3-76**

Leading Edge



Model M $995

(Dual floppy version) $1495 (20 Meg hard disk version). 100% IBM compatible, 256k, serial and parallel ports, 6 expansin slots, dual speed clock and calendar, Keytronics keyboard, high resolution monochrome monitor. 384k expansion boards available for $159; leading Edge Word Processor available for $89. For more information on this and other super bargaines see ad index for full page **BCE** display ads.

(120A) MS/DOS COMPUTERS WANTED

(120B) MS/DOS PERIPHERALS



1200 bps Modem Liquidation

64% OFF

$159

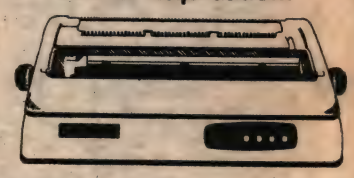
US Robotics Password Modem-autodial- autoanswer; works with Crosstalk, PC-Talk, and most other telecommunications software; works with IBM, Apple, Kaypro and all other ASCII standard computers and terminals, RS-232C Male/Female Interface. For more information on this and other super bargains, see ad index for **BCE** display ads.



Attention IBM Wordstar Users!
Up to 65% off:
For IBM PC and Compatibles

Correctstar (updated Spellstar) -corrects spelling from 65,000 word dictionary; offers alternative words. Just type a word the wat it sounds and Correctstar will find the correct spelling. (Note: program requires 192k RAM). **Starindex**- creates an alphabetized indices and tables of contents: **Mailmerge**-merges files for personalized form letters; assembles mailing labels. Starindex- list price is $99, our price is $75 (25% off); Mailmerge-list price is $99, our price is $75 (25% off); Correctstar-list price is $145, oru price is $75 (64% off); Package of Mailmerge and Starindex-list price is $198, our price is $99 (50% off). Package of Correctstar and Srarindex or Correctstar and Mailmerge-list price is $243, our price is $99 (60% off). All three packages-list price is $343, our price is $119 (65% off). Call **BCE**, 7 days a week, 24 hours a day. **1-800-545-7447.** See ad index for other **BCE** bargains!

Printer Liquidation!



40 CPS Wide Carriage, Daisy Wheel, Letter Quality Printer

80% OFF

$349

C. Itoh model F10-40 (made for Commodore)- diablo 630 compatible, 40 CPS, centronics, parallel interface, 2K buffer, bi-directional, optional sheetfeeder and tractor feed. For more information on this and other super bargains, see ad index for **BCE** display ads.

Printer Liquidation!



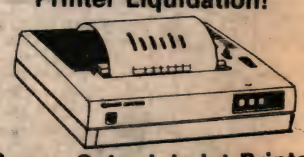
NEC NLQ Printer

70% OFF

$149

NEC-PC-PR103A-near letter quality dot matrix, 80 characters per line, 92-110 cps draft mode, 46 cps near letter quality, frictin and tractor feed, centronics, 8-bit parallel interface, 10" carriage. For more information on this and other super bargains, see ad index for **BCE** display ads.

Printer Liquidation!



Canon Color Ink Jet Printer

72% OFF

$199

Canon PJ 1080A Ink Jet printe-37cps, 640 dots per line, 7 striking colors, can be used for overhead projections. Works wil all standard IBM graphics packages. For more information on this and other super bargains, see ad index for **BCE** display ads.

(121) KAYPRO COMPUTERS FOR SALE

★ ★ ★

All used products over $100. Buy/sell through nationwide listing service. **NO CHARGE** for buying direct from owner. **NO RISK** for sellers - 6% commission when suc-

AFFORDABLE HARD DISKS FOR YOUR Z80

HARD DISK SYSTEMS by Emerald Microware

Now is the time to take advantage of the low prices on hard disk drives. We have everything you need from the host board to a complete turn-key system for your computer, order only as much as you need. Runs on Xerox 820-1 or -2, Kaypro, or most **ANY Z80** based system.

HDS Host board
- Plugs into Z80 socket, no wiring required (special 50 pin host is available for Kaypro 84 series computers)
- Interfaces directly with 40 pin Western Digital 1002 series controller boards
- Comes fully assembled and tested
- Switch selectable I/O addressing

HDS Software package by MICROCode Consulting
- Drivers locate above your existing operating system and BIOS, so it will not interfere with your other programs that install down below.
- Custom installs for your system without having to assemble any software
- Reserves system tracks and swaps so you can Warm Boot from hard drive
- Allows installation of up to two hard drives and two 5 ¼" floppies on one WD1002-05 controller board
- Runs diagnostic on system each time hard drive is installed
- Can be configured for 5 to 40 Meg hard drives, from menu or custom install
- Includes manual, FORMAT, TEST, PARK, INSTALL, and SWAP utilities

Western Digital 1002-05 Hard Disk Controller Board
- 5 ¼" profile with standard 5 ¼" power connection (only 5 VDC required)
- Has WD2797 floppy controller and interface on board
- Can control up to three hard drives and four 5 ¼" floppies.
- 40 pin host interface
- ST506 compatible hard drive interface

HDS TURN-KEY HARD DISK SUBSYSTEM by Emerald Microware
- External hard disk subsystem complete with all cables, controllers, hard drive, and cabinets with power supply, fully tested and burned in. Host adaptor and full installation kit supplied with software on disk format of your choice.
- Internal hard disk subsystem for '84 series Kaypro computers, complete with host, controller, cables, 3 ½" hard drive, mounting hardware, and fan.
- Available as 10, 20, or 40 Meg, single or multi-drive systems
- External units available with both hard disk and 5 ¼" quad density floppy drives installed

10 Meg Single drive Subsystem	$ 795.00
20 Meg Single drive Subsystem	$ 995.00
Host board with software package	$ 89.00
WD1002-05 Hard disk controller board	$ 185.00
WD1002-05 controller with Host and software	$ 250.00
20 Meg with dual 5 ¼" floppy subsystem	$1295.00

XEROX BOARDS AND ACCESSORIES

We stock a limited quantity of Xerox parts and accessories for the 820 computers.

Xerox 820-2 Main Computer Board	$ 95.00
Xerox 820-2 Floppy controller board	$ 75.00
Xerox 820-2 Main board with floppy controller board	$150.00
Xerox 5 ¼" disk drive cable	$ 12.00
Xerox internal video harness with brightness control	$ 9.00
Parallel ASCII keyboard (no numeric pad) with docs	$ 25.00
PC mount power connector for 820 board	$ 2.50
Dual half height, 5 ¼" disk drives (new), DSDD - 48 TPI, in cabinet with Xerox standard cable	$265.00
Dual half height, 5 ¼" disk drives (new), DSQD - 96 TPI, in cabinet with Xerox standard cable	$295.00

We guarantee satisfaction on all of our products or your money back. Include $4.00 shipping and handling, $7.00 for COD, call for Blue Label charges. Phone hours: 8:30am to 5:00pm weekdays; modem hours: 10:00pm to 8:00 am seven days a week.

WE SUPPORT OUR CUSTOMERS

Is single density making your Xerox 820-1 feel crowded?

DOUBLE DENSITY FOR THE XEROX 820-1 OR BIG BOARD I

Clearly the most versatile double density package available for the 820-1. Lets you run up to four disk drives at once, and mix 5 ¼" & 8". Runs almost all Kaypro and Xerox 820 software. Supports all standard printers and most add-ons such as the Ferguson ram board. Our ROM sets operate in banked mode to allow more space in the TPA for your programs. You get Mini-monitor functions, autoboot capability, automatic disk identification (up to 19 formats built in), IOBYTE enabled for device selections, and you can read and write 48 TPI disks on 96 TPI disk drives.

X120 Board - assembled and tested - with ROM set	$160.00
X120 Board - full kit - with ROM set	$140.00
X120 Bare board with ROM set	$ 72.00
X120 Bare board only	$ 26.00
ROM set only	$ 50.00
Hard to find parts set (trimmers, caps, resistors)	$ 12.00
WD2793 controller chip	$ 22.00

Other packages available.

Can't find CP/M for your Xerox? Now you don't need it.

QP/M by MICROCode Consulting

At last, an inexpensive replacement for CP/M, and you don't need CP/M to get started! Get full CP/M compatibility with many new options. Stamp your file with the time and date - transparent to your operation, automatically re-log your disks (no more control C), change your default drive search from the keyboard, use up to 31 USER areas, select your disk drives or user areas with semicolon or colon, maintains ARCHIVING bit for efficient backups (great for hard drives), and much, much more. Runs in native Z80 code, in the same space as CP/M 2.2. Has menu oriented install for use on ANY Z80 based system. Available as a bootable disk (with BIOS) for the Xerox 820-1, 820-2, 820-XPRO, 820-PLUS2, or Kaypro.

QP/M, bootable for the Xerox 820-1, 820-2, or Kaypro	$ 80.00
QP/M, bootable for the Xerox 820-1 using XPRO or PLUS2	$ 65.00
QP/M, without BIOS (not bootable)	$ 60.00

Tired of carrying your computer back and forth? Why not just the diskette?

UNIFORM and UNIDOS by Micro Solutions

The solution to the diskette incompatibility problem. This program allows files to be transferred back and forth between close to a hundred computer formats including between CP/M and MSDOS. Lists computers by name - no special technical knowledge required. Versions available from stock for the Kaypro (XPRO), Xerox 820-2, Morrow MD2&3, and IBM 100% compatibles. Other versions available on request. Unidos allows you to run CP/M 80 programs on your IBM compatible. Requires NEC V20 chip on P.C.

Uniform or Unidos	$ 64.95
IBM Uniform with Unidos and V20	$145.00

PANASONIC HALF HEIGHT DISK DRIVES

These are some of the finest new 5 ¼" disk drives. They are fast, reliable, and have about the lowest power consumption around.

National JA551 (Shugart 455) - DSDD, 48 TPI	$114.00
National JA561 (Shugart 465) - DSQD, 96 TPI	$129.00

EMERALD MICROWARE

P.O. BOX 6118 | ALOHA, OR 97007 | (503) 642-1860

PREMIUM QUALITY! **UNITECH'S** LIFETIME WARRANTY!

DISK SALE!

FROM 35¢ EACH

WE DON'T SELL FANCY NAMES, BUT WE SURE SELL THEIR DISKS!

When you buy a name-brand disk, you pay for more than just the disk, you pay for fancy advertising, fancy packaging. But when you buy a UNITECH disk, you get a PREMIUM QUALITY, HIGH RELIABILITY, fully guaranteed disk, identical to disks that sell for many times our price! When you buy a more expensive diskette, you aren't necessarily buying a better product.

WHO MAKES UNITECH DISKS?

They are made by top USA makers, and should not be confused with low-end, seconds, or cut-rate disks. Since we are one of the largest disk buyers in the world, the manufacturers give us their best prices! In our agreement with the manufacturers, we can't reveal their names, but when you receive them you'll recognize these as among the highest-quality nationally-advertised disks!

PRICE vs. QUALITY

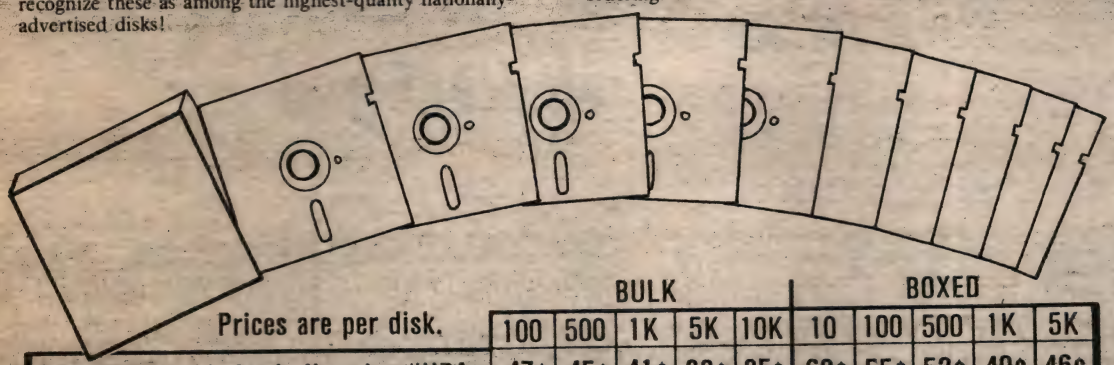
We've tried almost every brand of disk in the world, but we haven't found a more reliable, higher quality disk than the Unitech Disk. A labeled disk is not necessarily better, it's just labeled! Cheaper disks may seem like a bargain, but only until you try to use them. Unitech is so sure that our disks are 100% perfect that we offer our famous UNCONDITIONAL 30 MONEY-BACK SATISFACTION GUARANTEE, AND OUR LIFETIME REPLACEMENT WARRANTY!

UNITECH: THE BEST PLACE TO BUY YOUR DISKETTES

Unitech has extremely high standards of quality. People that buy Unitech disks are so pleased with our diskettes that they come back again and again! Word-of-mouth can make or break a company, and through our committment to excellence in products, service, and price, Unitech has benefited from an unprecedented number of referrals by satisfied customers. Our customer-service staff enjoys selling Unitech's high quality products at a pro-consumer company. We have received many letters complimenting our blue-ribbon customer service staff, and we're proud of them!

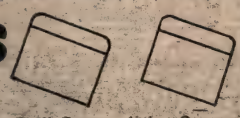
PROPERLY PACKAGED & PRICED!

You can buy our disks BULK, with no sleeve, box or label; or BOXED complete with a label for notations, sleeve, a re-useable box that holds ten disks, and write-protect tabs (on request). Please specify type when ordering.



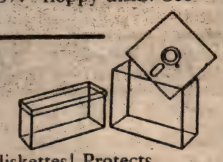
Prices are per disk.	BULK					BOXED				
	100	500	1K	5K	10K	10	100	500	1K	5K
SS/DD-35trk for Apple II series #UDA	47¢	45¢	41¢	38¢	35¢	60¢	55¢	52¢	49¢	46¢
SS/DD-for Single side computers #UD1	59¢	57¢	55¢	50¢	46¢	75¢	67¢	65¢	63¢	57¢
DS/DD for IBM-PC & compatibles #UD2	67¢	60¢	58¢	56¢	54¢	85¢	75¢	68¢	66¢	64¢
DS/QUAD DENSITY (96tpi) #UD4	1.09	1.04	99¢	92¢	89¢	1.19	1.11	1.06	1.02	99¢
DS/HD "HI-DENSITY" for IBM-AT #UAT	2.15	2.12	2.10	2.08	1.99	2.40	2.25	2.22	2.20	2.18
3½" single side #UD3	1.86	1.83	1.80	1.77	1.74	1.89	1.86	1.83	1.80	1.77
8" SS/SD soft sect. #UD8						1.20	1.00	1.00	1.00	1.00
5¼" SLEEVES, #24 white wove #SLV	4¢	3.5¢	3¢	2.8¢	2.6¢	Specify BULK or BOXED when ordering disks.				
5¼" SLEEVES, white tyvek #TYV	6¢	5¢	4.5¢	4.3¢	4.1¢					

TYVEK SLEEVES 100 for $6



White lint-proof plain sleeves for 5¼" floppy disks. See chart for quantity pricing.

UNIFILE-10 99¢



Library Storage Cases, holds ten diskettes! Protects archival copies, master disks from dust and debris. Snap together clear plastic design, 6x6x1.25" #FILE10 10/95¢ ea

UNIFILE-70 $8.88



Holds over 70 5¼" diskettes! Complete with index dividers and flip-top lid. Smoke colored tough plastic construction. #FILE70 case of 24/$7.99 ea

UNIFILE-100 $13.88



Holds over 100 5¼" diskettes! Removeable clear top, with lock and key! With index dividers. #FILE100 case of 24/$12.49ea

UNIFILE-40 $8.88



Holds forty 3½" diskettes! Complete with index dividers and flip-top lid. Smoke colored tough plastic construction. #FILE40 case of 24/$7.99 ea

UNIPAK DISKETTE MAILERS 10 for $5



Each holds up to three 5 disks! Virtually bend-proof, protects your diskettes in the mail. Costs as little as 56 cents FIRST CLASS POSTAGE in the UNI-MAILER, less than most other mailers! 6 x 8. Cat No. UNIPAK

RIGID-PAK DISKETTE MAILERS $1 each



Each holds up to five 5¼ disks! Bend-proof hard plastic, protects your diskettes in the mail. 6 x 6". Cat# RPAK

HALF-HEIGHT DRIVE DUMMY PANELS $1

Allows the installation of a half-height drive in a full height space. Ripple finish black plastic blends in with the design of most disk drives! #HHP

SHOP WITH CONFIDENCE: Unconditional 30 day money-back guarantee on all items! Unitech disks also carry a lifetime replacement warranty!

HOW TO ORDER: Order by phone or mail, pay by MC-Visa-Amex-COD, or send check with order, minimum order $20, add $3 for shipping plus $2 if COD. Canada add $5 shipping. We can ship open account to schools and major firms with good credit, minimum purchase order $100, FOB Unitech. All orders MUST include daytime phone and STREET address. Customer service hours: Monday-Saturday 9:00 am to 5:30 pm. *All orders shipped within 2 business days after receipt. When in Boston/Cambridge, visit our retail store!

NOTE: These prices superceed all previous prices, and are in effect until our next price list is published. Items sold by Unitech are subject to prior sale. Prices are subject to change without notice. We reserve the right to limit quantities. References to manufacturers or their trademarks are made solely for the purpose of compatibility. All returns require receipt.

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cessful. Open 24 hours if you have a touchtone phone. **203-762-8677.**

COMP-USED
85 Rivergate Drive, Wilton, CT 06897. 3-76

BUY/SELL USED COMPUTERS
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800-832-8726
VISA/MC Accepted ● 617-491-4888. 3-75

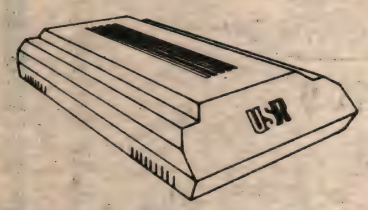
Kaypro IV all standard software and manual plus Smartkey. Excellent condition $700. **R. Rubin, 203-852-9618.** 2-75

(121A) KAYPRO COMPUTERS WANTED

(121B) KAYPRO SOFTWARE, PERIPHERALS

43¢/PROGRAM for the best 70 Kaypro Public Domain programs - including 16 games (adventure, blackjack), 40 utilities, 13 application programs and Modem7 (Kaypro version). Send $30 for 6 disk set. **Public Domain Users Group,** Box 1442-K1, Orange Park, FL 32067. 1-75

BETTER GRADES! Isn't that what you want from educational software? SPELLBOUND is a new program from ROBINSOFT that REALLY TEACHES spelling and it's AFFORDABLE too. Works with any spelling list (try foreign languages too!), uses recognized educational techniques, and incorporates an adjustable difficulty level. Available on diskette for CP/M. $14.95 ppd from: **Robinsoft,** Dept. C, PO Box 666, Prineville, OR 97754.



1200 bps Modem Liquidation

64% OFF

$159

US Robotics Password Modem-autodial-autoanswer; works with Crosstalk, PC-Talk, and most other telecommunications software; works with IBM, Apple, Kaypro and all other ASCII standard computers and terminals, RS-232C Male/Female Interface. For more information on this and other super bargains, see ad index for **BCE** display ads.

QUERY III PLUS is: only $139.95, state of the art, third generation, plain english commands, menu driven, easiest to use, runs faster, sorts faster, not copy protected, 13 programs, 255 characters by 255 fields by 65,535 records limited by your storage, search on up to 40 conditions, create from letters and reports from one or many databases, default or custom mailing labels, programmable to perform a series of functions with one keystroke, perfect math, and much more. Plainly stated the ULTIMATE DATABASE MANAGEMENT SYSTEM on the market today for any amount! Reasonably priced for a limited time at $139.95 plus $3.00 shipping and handling. Specify CP/M format. **TARGET SOFTWARE,** PO Box 1846, Kernersville, NC 27285. 3-75

(123) SANYO COMPUTERS FOR SALE

(123A) SANYO COMPUTERS WANTED

MBC 3000 in working condition. Call or write: **Mike Slivka,** 2552 Moorman Avenue, Cincinnati, OH 45206. **513-961-1323.**

(123B) SANYO SOFTWARE, PERIPHERAL

DOMAIN/COMMERCIAL SOFTWARE! Rent DS/DD Diskfulls of SANYO 550/5 Software for $1, buy $3 (including disk). **804-851-6864, Colony,** Box 808, Langley AFB, VA 23665.

OPUS

Are you tired of expensive terminal programs which don't work correctly on the Sanyo? Well, the OPUS series is for you. They are 'State of the Art' terminal programs written exclusively for the Sanyo 550/555. The OPUS series feature: Auto Logon, Auto Key, Xmodem, DC2/4, manual ASCII capture, full parameter control, disk utilities, on screen menus, windows, etc. OPUS 2 is for the standard Sanyo. OPUS 3 is for the Sanyo with Video Board. OPUS 2 and OPUS 3 with 41 page manual, $20 PP. **Bob Jack Software,** 8371 White Road, Burbank, OH 44214. 2-75

PUBLIC DOMAIN SOFTWARE for Sanyo MBC 55X computers, all tested on Sanyos. Games, financial, utilities, more. $1 (refundable) for catalog. This month's pick; ASSEMBLY LANGUAGE for Sanyo - assemblar, on disk manuals $5 (specify format). **Software Library,** POB 204, Prosser, WA 99350.

SANYO 550/555
PUBLIC DOMAIN RENTALS

90 VOLUMES-RENT AND COPY for $1 each or we copy for you. $3 SSDD, $6 DSDD. Sampler $5 Mastercard, VISA! Recorded info/order **619-941-3244** (anytime), or LSASE (specify computer): **FUTURESYSTEMS,** Box 3040(C), Vista, CA 92083.

SANYO 550/555
PUBLIC DOMAIN

90 VOLUMES-RENT AND COPY FOR $1 each or we copy for you. $3 SSDD, $6 DSDD. Sampler $5. Mastercard, VISA! Recorded info/order **(619-941-3244** (anytime), or LSASE (specify computer): **Futuresystems,** Box 3040(C), Vista, CA 92083.

SANYO FUNCTION Key Temp-Plates(tm) for MBC-550/555 series computers. 10 preprinted Temp-Plates — WordStar, CalcStar, EasyWriter, MS-DOS 2.11, Sanyo BASIC, GW-BASIC, dBASE II, Lotus 1-2-3, PC-File III, and PC-Write plus 2 "fill-in-your-own" Temp-Plates — all 12 for $9.95 postpaid. Cash, check, MO — no COD or credit cards. **Shoreland Computing,** 711 Clinton Street, Grand Haven, MI 49417. 4-77

★ ★ ★

"SANYO MBC 550/555 Beginner and Intermediate Guide." 360+ pages plus disk with 56 programs. $29.95 postpaid USA/Canada. VISA/MC Okay. **818-346-7024.** 3-76

Survey-Boundary 550/555 MSDOS 2.11 $29.95. Manual only $1.00. **P. Billings,** Dept. CSA, 12134 Bonnie Terr., Seminole, FL 33542. 1-77.

VIDEO BOARD for sale for Sanyo MBC-550 series, used 1 month, complete with Basica disk, manual and warranty card. $110. **Lane McCollum,** 212 Monticello Street, Scottsboro, AL 35768. 205-259-1765. 4-76

WHY PAY DOUBLE? Rent DS/DD diskfulls of SANYO 550/5 software for $1, buy $3 (including disk). **804-851-6864, Colony,** Box 808, Langley AFB, VA 23665.

(125) SINCLAIR COMPUTERS FOR SALE

TIMEX SINCLAIR WESTRIDGE 2050 MODEM with SMARTTERM I & II; seldom used; original price $150 - asking $100. Call Michael at **913-842-3295.**

(125A) SINCLAIR COMPUTERS WANTED

(125B) SINCLAIR SOFTWARE, PERIPHERAL

2068 BANNERS with your 2040 printer. Includes alphabet, numbers, punctuation. Easy to run. Sample $2. SASE. Cassette $14.95 PP. **David Trevor,** Box 46208-T, Phoenix, AZ 85063. 11-78

CLOSEOUT! TS1000/ZX81 software from 99¢. SIMULUSION-CS2, Box 2382, LaJolla, CA 92038. 4-78

Compusa disk Ulities. Add capability to copy disks, read fractional tracks, recover deleted files, more. SASE for information. **SiriusWare,** 6 Turning Mill Road, Lexington, MA 02173. 2-75

FREE CATALOG, Timex Sinclair 1000, 1500, 2068, **SPECTRUM** and **QL. Basically Programming,** Dept. C. 2528 W. Olive Avenue, Fullerton, CA 92633. 714-738-0666. 7-76

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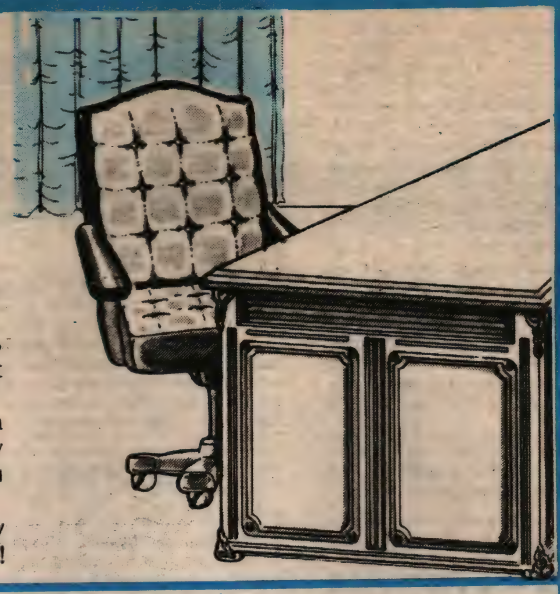
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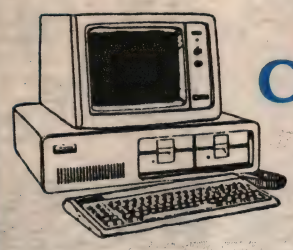
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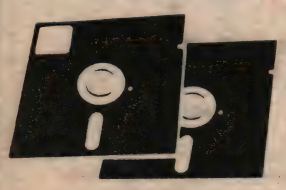
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(129) S-100 COMPUTERS

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COMPLETE S-100 SYSTEM. Jade 2/4MHz Z80 CPU. Computine 5"/8" DS/DD FDC. Supports many popular 5" and 8" formats, ideal for 8" to 5" file transfers or 16 bit upgrade. Digital Research 64K SRAM. SSM 2SIO-4PIO I/O board. Complete with PS, enclosure, and software library. Shugart 850 8" DS/DD drives with PS and enclosure. No reasonable offer refused. **215-782-1452, evenings.** 2-75

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CROMEMCO SYSTEM one; ZPU Tu-Art, 4 PIO, D+7A I/O 64KZ, PRI, 4 FDC, software. **618-288-5805.**

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CompuPro Systems. CompuPro 816-A with 380K RAM, 512K M-drive H board, 8-inch drives and Televideo 950 terminal, asking $4500. CompuPro 68L with 128K RAM, MMU, 8-inch drives, Televideo 914 terminal, asking $3200. Make us an offer on either or both of these systems. Contact **Donald Howes,** NW 1013 State St., Pullman, WA 99163 **509-332-0515** or **David Whelchel,** NW 234 Sunrise Drive, Pullman, WA 00163 **509-332-7068.**

★ ★ ★

Compupro System 8-16D H40 Multiuser computer, PC compatible 15 user system, 10 Mhz 8086-87, 512k RAM, interfacer 3, interfacer 4, system support 1, disk 1a, disk 3, 1.5 Mbyte MdriveH, QUME QVT 102G terminal, concurrent DOS, DRI C, CB86 compiler, personal BASIC wordstar86, dBASEII86, RASM86, Many Utilities. $4995. Call **Mike at 206-935-8247.**

★ ★ ★

For Sale: Compupro S100 cards & std. original CPM86 software for 30-50% off original price. M Drive H (512k), RAM21 (128k), SuperCalc II, Dbase II w/tutorial & screen editor, Uniforth, Vedit plus Editor, Oasis Word Plus Spell chk., Micro script/ed formatter/editor, 2500 AD macroassembler, DR Cbasic interpreter, Cbasic compiler, Computer Innovations C86 compiler. **Call Doug-evenings 919-828-6815.** 3-75

For Sale S100 Boards Cromemco boards 16KPR, 16KZ Wamco FPB1 front panel Vector Graphic 8k RAM, SSM MB6B 8kRAM, 16k EPROM, 104 2P2S I/O, 8 inch Persci FD Drives, cherry keyboard w/78 keys, all priced to sell. **Samuel Kraemer,** 901 S. STanley, Stillwater, OK 74074. **405-377-8867** 6-8pm Daily. 4-76

GOLD! - Recover pure gold from old scrap circuit boards, electronics, etc. Very easy. My book tells how. Send $25. **J. Sciuto,** Box 129, Methuen, MASS 01844. 5-75

Godbout desktop mainframe $350. Advanced Digital Superquad Z80/64k/disk controller/serial $250. Two MuSYS NET-80 slave processors (64k) $195 each. Three MuSYS NET-82 slave processors (128k) $295 each. Morrow M26 second drive $495. Two SMS 64k static ram $95 each. LDP 128K ram with 128k expansion board $149. Many more items! **K & K Systems,** POB 41804, Minneapolis, MN 55441-0804. **612-475-1527.**

HI-RES GRAPHICS S-100 system. 512x480x16 million colors, Ithaca series II cpu, 128K RAM, FDC with dual Shugart 850 8" DSDD drives, Zenith H-19, dual RS232 parallel interface, 8 Scion Microangelo graphic boards with RGB-composite palette board and camera frame grabber. CP/M 2.2 with all support software. Complete hardware software documentation. Much much more. Call. $3000. **405-395-3153.** 4-76

Ithaca InterSystems Computer boards: 256k memory $400, VIO $150, FDC2 $225, XPU $300, HDA $250, 6S10 $225. **Frontenac Designs, 607-387-5303.** 3-76

Musys Multiuser System. Musys 3 user Systems with 2-30 mB hard disks, 1-1.2 mB floppy, 3 Televideo 925 terminals Turbodos operating system, communications software, cables and dust covers. $5,000. **Paragon Computer Corporation, 203-525-0389.** 3-76

Northstar Horizon 4MHz 64k Z-80A system, 2/DSDD drives video board, modem, Wordstar, Mailmerge, 100+ diskettes with much software, complete documentation $650. **See Advertisement in Classification -112** for S-100 boards. 30 day warranty. Make offer. **Bond & Associates, 707-823-1232.**

S-100 CARD SALE!!

S-100 ENTHUSIASTS! Write the S-100 BOARD BANK for savings on USED items. Subscribe to THE STATEMENT, the irregular, official organ of THE S-100 BOARD BANK. Send $4.37 or more to **S-100 Board Bank.** Mailorder Dept. C2, Box 344, Olympia, WA 98507. 1-77

SIERRA DATA SCIENCES Master, slave, hard disk. **Integrand Rack-Mount** mainframe, disk cases, various power supplies - all Mint. What do you need? **Bob 516-921-1465.**

Super Deal Cromemco Z-2! Z-2 Mainframe. 2 Ea: ZPU (Z-80 CPU), 32K Bytesaver (EPROM Prog.), Tuart (Par-Ser Interface), Shugart 851 drives, Wangco 5" drives. 1 ea: 64 FDC & 4FDC Disc controllers, PRI (printer interface), 64K SRAM, hayes Micromodem 100 (new in box), Mullen extender card, printer, Soroc Term. I'll throw in (2) 64K DRAM. System up and running $1300. **Orlando Ide, wk.#408-748-1200 hm.# 408-720-8456.**

WANTED: 68000 Operating System!! CP/M68K OK, prefer multitasking. Need assembler, languages, good 68000 editor; docs, software for Cromeco DPU Z80/68000. Have many S-100 cards, controllers-am flexible. Must be cheap, trade. **S-100 BOARD BANK,** Box 344, Olympia, WA 98507. 3-75

WANT S-100 CARDS!

BOARD BANK BUYS 'EM ALL! (Well, almost.) ROM, RAM, CPU, VIDEO, GRAPHICS, I/O, AD/DA, FDC, HDC, SPEECH, the uniquer the better! Convert your extras to CASH. We buy SYSTEMS, peripherals too. Send FULL description and CHEAPEST asking PRICE to **S-100 BOARD BANK,** Mailorder Dept. C-2, Box 344, Olympia, WA 98507. 1-77

Wanted to Buy: Ithaca intersystems DPS-1 system, boards and components. Need HDA, 256KDR, V10 and others. **Robert Reinking,** Dept. Of Physiology AHSC, Univ. of AZ., Tuscon, AZ.85724 **602-626-6517.**

Z80 64K, 6-slots, two 5¼ DSDD drives, read-write multiple formats, bootable disk, new looking, $600. **Green 14" terminal,** $250. **Eprom Burner** 2704-2732, 2508-2564, CP/M software, expansion box, $250. All Mint. **Bob 516-921-1465.**

(130) S-100 COMPATIBLE, PERIPHERAL

2 LSI Shuggurt 801 disk drives, $100 each; 1 well used, but running Televideo 920 terminal $75; 1 new televideo 920 terminal $175. Call **715-723-1925 after 5:00 pm ask for Doug.** 2-76

5 Megabyte hard disk drive subsystem for all S-100 systems. Kit $450. **Digital Search 803-877-9444.**

8K STATIC RAM $25. 2-Calcomp 142 8" w/Imsai case, $225. 2-Calcomp 140, w/case $200. 1-Adds Regent 60 CRT $225. Centronix 781 printer $85. **615-355-1061.** Jim Carroll, 304 Lexington Dr., Smyrna, TN 37167. 1-77

COMPUPRO INTERFACER 3-8 $200. System support one $140. CPU 8085/8088 $100. CPU Z-80 $75. Disk one $125. **408-423-0122.**

EPROM programmer by Ackerman Digital, will burn all 1-2-4-8k EPROMS, with software and docs. $250 OBO. **215-782-1452, evenings.** 2-75

S-100 USERS

INTELLICOMP INC. offers the following S-100 products, an 8MHZ 68008 processor card at $65 bare board, $210 kit or $265 assembled and tested, hardware Debug card showing S-100 bus and 68008 control signals on hex and LED displays at $65 bare board, floppy disk controller for DSDD 5 and 8 inch disks at $75 (includes CP/M 68K BIOS and boot prom software source), and a prototyping board at $55. The 68008 can be single stepped from the Debug card. All boards are standard, readily available parts. All boards run with Digital Research Computers 64K RAM boards and semi disks. All boards have a solder mask and gold plated edge connectors. Prices include shipping. Detailed descriptions of the CPU and floppy controller appear in issues 16 and 20 of THE COMPUTER JOURNAL. For additional information call **Intellicomp, Inc.** at 614-846-0216 (evenings best time) or write: **Intellicomp, Inc.,** 292 Lambourne Ave., Worthington, Ohio 43085. Attn: Bruce Posey.

SASE Winchester Controller $75 each, 2/$140, SMS model FWD 5001. Simple host adapter required. Runs Shugart and Quantum drives. **William R. Wood,** 4863 S. Livonia Rd., Livonia, NY 14487. 4-76

VIASYN/COMPUPRO S-100 boards, used, working, most are current rev. level, all with warranty. CPU85/88, CPU8086, or CPU68K $200 ea, CPUZ $125, Interfacer1 or 2 $100 ea, Interfacer4 $225, Disk1 $175, Disk2 $200, Disk3 $325, Sys Support1 $225, RAM17 or RAM16 $175EA, RAM20 $100. Compupro system enclosure $500. Drive enclosure also available. Special pricing on brds. with purchase of disk drives, see Ad heading #172 Disk Drives. Also some unused boards available. Call **714-820-1258,** or write **Michael Louie,** 1118 Lancewood Ave., Rialto, CA 92376. 3-75

(131) S-50 COMPATIBLE, PERIPHERAL

5 Megabyte hard disk add-on for SS-30 or SS-50 from $450, with software and interface. **Digital Search 803-877-9444.**

"SWTP SYSTEM/Components: 6800 computers w/MPU 4K and 8K memory, parallel and serial interface AC-30 cassette interface, TVT-II terminals/components, MSM MSI 8" disk system; all manuals, lots of software. Sell all or part of this piece of micro history. Phone **616-642-9873** after 7:00 p.m. 4-76

(132) HEATH COMPUTERS FOR SALE

Wanted: Z-89-37 soft sector disk controller board. Must be reasonable. **209-951-4451.** 3-75

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Z-100 ALL-IN-1, 720K, 11MB Winchester, 1.5MB UCI RAM board, Gemini board, IBM compatible, Manuals, Software incl. MSDOS, dBASE III, FRAMEWORK, SYMPHONY, more. All for $3950. **804-868-9124 Steve.**

Z-100 LOW profile computer with two disk drives, 768K of RAM memory, very high resolution color 14 inch monitor, Panasonic 1091 printer. Includes MSDOS, Autocad, Lotus, DBASE II, Wordstar 3.3, GW BASIC, BASIC 80, ZPC emulator. Call Joe at **505-266-2344,** asking $3000 and I will pay the shipping. This unit has the new motherboard.

Zenith 110 low profile, 10mb hard disk, 786k, 8mhz, monochrome, monitor, latest DOS2, GWBASIC2, programmers utilities, diagnostics, $1995. **K & K Systems, 612-475-1527.**

(132A) HEATH SOFTWARE, PERIPHERAL

5 Megabyte add-on hard Disk subsystem for Heath-89. Kit $475. **Digital Search 803-877-9444.**

★ ★ ★

SPEED MODULE for Heath H89. Software selectable 2/4 MHz. No board modifications required. $34.95 including shipping. **Micronics Technology,** 449 Barbados Way, Niceville, FL 32578. **904-897-4257.**

(133) BURROUGHS SYSTEMS

B92 System, 1MB inbuilt floppy, 18.8MB hard disk, memory 128k, console 120 cps printer, display terminal, CM90 MCP, CM90 VTL., manuals, Reasonable offer. **Olds Paths Tract Society,** Shoals, IN 47581. **812-247-2560.**

HELP

Wanted To Buy: Burroughs Self Scan Displays and Nixies. Call **Jan Rondo Electronics Inc., 201-782-7814.** 4-77

(134) HEWLETT PACKARD COMPUTERS FOR SALE

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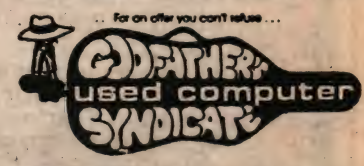
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HP110 Portable Computer, new battery, Edisk, built-in modem, ROM-based Lotus 1-2-3, word processor, includes BASIC with compiler, Thinkjet printer, 3.5" disk drive, many extras $3500. **Gregory A. Harrison,** PO Box 10574, Daytona Beach, FL 32020.3-75

H/P 150 Memory Expansion Board - 384K. Brand new, in sealed box. Originally $910. Asking $300. Call **Jay at 215-565-8835,** anytime.

HP-85 Excellent cond. $575. All HP-85 Software 60% off. List: **Terry 313-528-1571** or write PO Box 1034, Troy, MI 48099. 3-75



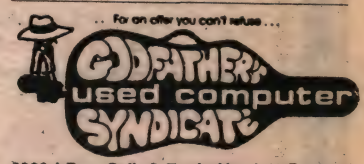
$$$$ HP-75C 16K $200 delivered with case. **Godfather's Used Computer Syndicate,** PO Box 3037, 1154 W. SR 436, Forest City, FL 32714. **305-774-1111.** 3-76

(134A) HEWLETT PACKARD COMPUTERS WANTED

HP-120; HP-125; 9121 disk; HP printers. Call **Eyles,** 6 Mechanic St., Pawcatuck, CT 06379. **203-599-5658 or 203-535-1296.**



$$$$ I buy, sell & trade Hewlett Packard Computers. **Godfather's Syndicate,** 1154 W. SR 436, Forest City, FL 32714. 305-774-1111. 1-76



$$$$ I Buy, Sell, & Trade Hewlett Packard computers. **Godfather's Used Computer Syndicate,** PO Box 3037, 1154 W. SR 436, Forest City, FL 32714. **305-774-1111.** 3-76

(134B) HEWLETT PACKARD SOFTWARE, PERIPH.

H-P 2621A Terminal - RS-232, 110-9600 Baud, 24x80 col., 2 pages scrolling memory $250. **Len 212-777-4353.**

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HP-71B ACCOUNTING

ACCTGCAL is an accounting spreadsheet that will keep and maintain a simple set of books for any type of business. Entries can be made weekly or monthly by inputting data from a check register and a cash receipts journal or a trial balance.

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Standard 5151	$109
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• ADD-ON BOARDS

1200B Internal Modem w/software (fully Hayes compatible)	$225
Standard multifunction board w/384K	$179
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384K memory expansion card w/0k	$79
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desirable, it is not required. Specify disc or tape. Send $80 to **Paul G. Delman and Associates,** 4900 N. Ocean Blvd., Ft. Lauderdale, FL 33308. Phone **305-943-0709. 4-77**

HP-75 TAX Preparation Software-1985. Used commercially by former IRS auditor. TAXCOMP menu-driven federal tax calculator (integrated Fed & NYS/NYC version also available (for every filing status.) INCAVER integrates w/TAXCOMP for Sched G—scrolling line by line display. HP-75 Visicalc templates for 1040, Sched A, Sched G, and integrated NYS IT-201 and IT-250 also available. Non-tax programs available include ORDANN (emulates HP-12C top row), and OPVAL (Black & Scholes, option valuation). SASE for brochure. TAXCOMP $12 or both $17 for cards & docs. Add-Post-AP **Pat Cully,** 410 Richmond Ave., Maplewood, NJ 07040.3-75

STOCK MARKET programs for HP 86/87 computers. Powerful programs for selecting and evaluating stocks and commodities. Send $39.95 to **Lock Software,** Box 3163, Baltimore, MD 21228. Specify disk size. 9-79

(136) DATA GENERAL SYSTEMS

GREAT OPPORTUNITY! Data General one like new; IBM Compatible, 256k, two disk drives, adjustable tilt screen, soft carrying case. SACRIFICE $1700. Call days, **516-466-6550.**

(138) DATA GENERAL, SOFTWARE PERIPH.

(148) DEC SYSTEMS FOR SALE

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COMP-USED

85 Rivergate Drive, Wilton, CT 06897. 3-76

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DEC 11/2 system RT-11 based. Includes 10Mb disk, printer and terminal. New in 1981 $2995. OBO. **615-728-9509. 4-77**

DEC PDT11/50. Two systems available. Dual floppy LSI-11 based. Received back from lease – no time to check them out. AS-IS $199 each or $350 for both. **K & K Systems, 612-475-1527.**

DEC PRO350, 768k, Bit-Map, FPA, 10mb, Floor Stand, POS2.0 TK!, MAPS Financial, $3,500 O.B.O. **312-295-5770 R. Tucker. 3-75**

DEC Pro350 - 16 bit CPU, 512 KB RAM, 10 MB hd, RX-50 drives, software includes: prograph, design graphics, executive, word-II, NPL, SuperComp 20, and many games and languages $3000. **201-932-0270 or 201-255-4512.**

DEC Pro350 system w/512k, 2 drive, 10M HD, floating point adapter, LA50 printer, Mono monitor, cables. List $7940, ask $4400. W/Comm. software $4500. **714-627-7411 Ken. 2-75**

DEC RAINBOW 100B

Mint condition, used less than 100hrs., 512KB memory, dual 400KB floppies, kybd., CPM/MS-DOS must sell. Original price $3555. Make offer. Okidata 92 serial printer $300. Call **Al 305-727-1357 evenings.**

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DEC Rainbows 100B 128-893K, CPM/DOS, some graphics, color, large amount of software. Start at $1800. **305-777-4663 or 773-3417. 1-75**

MICROVAX-New systems with 190mb disk, reel-to-reel tape available and Decnet. Call for specifics. **301-490-3608. 1-77**

PDP11/23 SYSTEM 160kb, MMU, FPU, floppy, 10mb disk, multiple ports, terminals, printers, spares, DEC installation, $9000 complete. Ideal for laboratory/educational applications. **Phylan Incorporated,** 614-846-6248. 3-75

PDP11/60 Compuer- with RH70 Disk Controller, 128k, TJE16 Tape Drive, 2 RMO2 Disk Drives, and 64 ports, $12,500 including shipping. **A. Lehr,** 1216 Dawson Road, #215, Albany, GA 31707.

(149) DEC SYSTEMS WANTED

(150) DEC SOFTWARE, PERIPHERAL



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US Robotics Password Modem-autodial-autoanswer; works with Crosstalk, PC-Talk, and most other telecommunications software; works with IBM, Apple, Kaypro and all other ASCII standard computers and terminals, RS-232C Male/Female Interface. For more information on this and other super bargains, see ad index for BCE display ads.

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Virtual Microsystems MS-DOS and CP/M Z-Chip for DEC PRO350. Includes Board, adaptor and software. $1,300 O.B.O. **312-295-5770 R. Tucker. 3-75**

(154) IBM SYSTEMS FOR SALE

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COMP-USED

85 Rivergate Drive, Wilton, CT 06897. 3-76

Compac Portable with 10 mB hard disk, 256 kb, DOS, software, Excellent Condition $2100. Add $300 for Okidata ML83A Printer. 30 day warranty. **Paragon Computer Corporation 203-525-0389. 4-77**

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System 23 with 5324 computer, 5242 printer, 5247 disk, $8500 or best offer. Days **305-676-2596,** Nites **777-1280 or 773-3417. 4-77**

UNUSED Televideo AT, completely IBM compatible at 30% additional speed. $2800. **Richard Seale,** 303-449-4897/443-4681. 4-76

(155) IBM SYSTEMS WANTED

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(156) IBM SOFTWARE PERIPHERAL

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Documentation MSDOS 2.11 or WS' 3.3 $10 each; 3" binders $3 each; Time Life Intro to IBM or WS Magic $5 each; **Short Card** uses 896K with present software includes 256K and RAM-disk program $139. All orders + $3 UPS ($5 COD). **P & A Company,** 29 Tee-Ar Pl., Princeton, NJ 08540. 4-78

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Data management system for most State Lotto drawings. provides detailed statistics reports for determining next Lotto drawing probabilities. IBM/Compatibles. $39.95. **Computer Solutions,** 2044 W. State St., Fremont, OH 43420. 4-77

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Multilink Multitasking Multiuser converts PCDOS to 8 user system, only $200. **Kim, 205-855-4600. 4-76**

Public Domain Software: for IBM PC & PCjr. Word processors, graphics, games, data programs and much more. Send for list. $3 per disk. **JDX DISK COPY SERVICE,** PO Box 1561, Corona, CA 91718. 4-76

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(166) MISC. (HARDWARE & SOFTWARE)

Basic A 2.0 user manual by Columbia. 10 day money back guarantee. $21.95 + $3 postage. **Dave Gillespie,** 1331 N. Lotta Dr., Los Angeles, CA 90063. 2-75.

HELP

Wanted To Buy: Burroughs Self Scan Displays and Nixies. Call **Jan Rondo Electronics Inc., 201-782-7814. 4-77**

IBM AT KEYBOARD - Used only minutes $175; IBM MONOCHROME display and printer adapter $200; Call **Scott** at **201-741-4672.** Will ship UPS.

NCR 8400 system for sale. Whole or part. CPU, printer, six 81MB discs, two drives, three terminals, documentation. **Tim Cullison,** St. Mary's Food Bank, 213 South 11th Avenue, Phoenix, AZ 85007. **602-254-9762.**

Pied Piper-complete system. Kaypro compatible with WordStar, DBase II, PerfectCalc, Two 880-K disk drives, built-in modem monitor. Loads of software. $700. Call **609-882-5710. 4-77**

Western Union Telexl model 5250 editor w/OKI printer $995. **Moorings Travel, David, 813-261-6700, Naples, FL. 4-76**

Hayes 1200 Smartmodem, litle used, $225; Epson QX10 Computer, 2 diskettes, 256k, Valdocs, CP/M, like new, $950; Okidata 82 Printer, like new $240. **A. Lehr,** 1216 Dawson Road, #215, Albany, GA 31707.

(172) DISK DRIVES

8' DSDD ½ht. Shugart Mod. SA 860-1 unused condition with full one year warranty, price $279; These drives have track to track access times of 3MS, they will work as replacements for Shugart 800, 801, 850, 851. They require no AC to operate. **CEC,** 1745 Adrian Rd., Burlingame, CA 94010. **800-228-3411.**

8" SSDD ½ht. Shugart Mod SA 810-1 unused condition with full one year warranty, price $269; These drives have track to track access times of 3MS. They will replace Shugart Mod 800, 801, or any other 8" SSDD drives, however they require no AC to operate. **CEC,** 1745 Adrian Rd., Unit 1, Burlingame, CA 94010. **800-228-3411.**

8" SSSD Drives $75. Can be used as Double Density. Removed from operational equipment. Shugart 8" 50 Hz, 220V conversion kits also available. **Digital Search 803-877-9444.**

$99 Hard Disk Controllers. These New Shugart 1610 controlelrs emulate other SASI controllers and mount directly on any 5¼" drive. 1610-1 emulates **DTC** 510 1610-3 emulates **XEBEC** S1410 1610-4 emulates **SCSI** similar to **ADAPTEC** 4000. Controllers work with BYTE's **COM180, ACS 1000, ISI 5160, AMPRO, WAVEMATE, TRS80, III, IV, APPLE, MAC, OTHERS.** Controller-$99; Manual & Schematic-$8; COD & Shipping $5. Quantity pricing available. California add 7% sales tax. **Computer Surplus Store,** 3675 DeSoto Ave., Santa Clara, CA 95051. **408-248-0134. 4-76**

Alignment disks 5¼ 48 TPI SS $15. **CEC,** 1745 Adrian Rd., Unit 1, Burlingame, CA 94010 **800-228-3411.**

★ ★ ★

All used products over $100. Buy/sell through nationwide listing service. **NO CHARGE** for buying direct from owner. **NO RISK** for sellers - 6% commission when successful. Open 24 hours if you have a touchtone phone. **203-762-8677.**

COMP-USED

85 Rivergate Drive, Wilton, CT 06897. 3-76

Bargain Priced 8" Disk drives! QUME DT8 DSDD Drives; Aligned $125EA, need alignment $100EA, not working $75EA or 2/$125. Siemens FD100-8 SSDD drives: Aligned $50EA, need alignment $40EA, not working $25EA or 5/$100. Siemens FD200-8 DSDD drives: Aligned $100Ea, need alignment $75EA, not working $50EA or 3/$99. TEAC FD50B 5" SSDD used by Tandy & NEC new working $50EA, need work $25EA. Drives sold as aligned. Have warranty, others sold as-is. Call **714-820-1258,** or write **Michael Louie,** 1118 Lancewood Ave., Rialto, CA 92376. 3-75

Cabinet for two 8 inch wide style Shugart drives. fan, all AC and DC wiring with power supply $100. **Cascade Electronics Inc.,** Route 1, Box 8, Randolph, MN 55065 **507-645-7797.**

DISK SERVICE MANUAL, DISK DRIVE TUTORIAL, PRINTER - PLOTTER MANUAL, COPIER MANUAL, COMPUTER PHREAKING, SUPER REINKING METHOD - More!! See enclosed display advertisement. Information ($1): **Consumertronics Co.,** Attn: Computers, 2011 Crescent, Alamogordo, NM 88310. 12-76

For Sale: 1 GDL Graphics Board A-1000 with 8088 processor S-100, 128K $500; 1 Zenith 13" RGB ZU136-long persistance Monitor, $450; 1 Qume 102-A Terminal $350; 2 Compu-Pro RAM 17 (64K) $250; 1 Compu-Pro Disk 2/channel select $400. **Cal Coastal,** 5 East Gabilan Street, Ste. 2318, Salinas, CA 93902. 2-76

Hard Disk Controllers- DTC 1404 for 14" HD $100; DTC 1404D for 14" HD + flpy $125; DTC 1408I for 8" HD + tape $125; DTC 700 for 8" HD + tape $125; DTC 520-1 5¼" HD + flpy $75; DTC 1403 for 8" HD $100; DTC 1403D for 8" HD + flpy $175; DTC 68 EXORBUS SASI HOST $45. **CSS 408-248-0134. 4-76**

IBM XT Full Height 10mb hard disk with CtLR. $390. **PCS/HDS,** Box 524, CML, CA 95009. 408-559-1568. 3-76

Innovex 200 8" SSSD Drives, excellent quality. Can be used double density. 4 for $100. Complete, but require alignment or adjustment. **Digital Search 803-877-9444.**

METAL ENCLOSURE/BRACKET for 3.5" drives $3.00; front bezel made by SONY for 3.5" drives $1.50. (Min. order $10). **GB Consulting,** PO Box 83, Laurel, MD 20707.4-76

MORROW 8in. disk drive, complete w/case and power supply. **Richard Seale,** 303-449-4897/443-4681. 4-76

Micro-floppy 3½" drives. 500k bytes Shugart SA300 w/warranty- $90 each. NEC FD1035, DSDD (1 meg) - $175 each. Same interface as 5¼" drives. **Digital Search 803-877-9444.**

QUME 8" HALF-HEIGHT, DSDD, Mint, still in box, $299. **Bob 516-921-1465.**

SASE Winchester Controller $75 each, 2/$140, SMS model FWD 5001. Simple host adapter required. Runs Shugart and Quantum drives. **William R. Wood,** 4863 S. Livonia Rd., Livonia, NY 14487. 4-76

SHUGART (100pcs) SA-200 5¼" TRS-80 compatible brand new original factory carton with OEM specification manual guaranteed $39.95 each. Shipped C.O.D. **Zytel,** 489 Johnson Ave., Bohemia, NY 11716. 516-567-6942. 3-76

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SPECIAL SALE

Shugart SA800-2 $59; TEC FB-501 5 ¼" ½ht. SS/DD $49; MPI 52S 5 ¼" DS/DD full ht. $55; Sixty day warranty-shipping extra. Documentation incluede. **LDL Electronics,** 13392 158 St. N., Jupiter, FL 33478. **305-747-7384**-See showcase ad for drive servicing.

Shugart Disk drives for sale. All units are reconditioned, aligned, tested, and carry a 180 day warranty. SA801R 8" SSDD: new $175EA, Used $125EA, SA851R 8" DSDD used $225EA, SA400L 5" SSDD used $75EA. All units are late revs. I have a new and used drive enclosures available. Also have S-100 BRDS for sale see heading #130. Special pricing available with purchase of disk controller BRD. **Call 714-820-1258,** or write, **Michael Louie,** 1118 Lancewood Ave., Rialto, CA 92376. 3-75

Winchester Controller Kit. Will control ST506 hard disk drives. $200. Faster than Western Digital WD1002 controllers. SA1002 8" hard disk controller also available. **Digital Search, 803-877-9444.**

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8" SSDD ½ht. Shugart Mod SA 810-1 unused condition with full one year warranty, price $269; These drives have track to track access times of 3MS. They will replace Shugart Mod 800, 801, or any other 8" SSDD drives, however they require no AC to operate. **CEC,** 1745 Adrian Rd., Unit 1, Burlingame, CA 94010. **800-228-3411.**

Alignment disks 5¼ 48 TPI SS $15. **CEC,** 1745 Adrian Rd., Unit 1, Burlingame, CA 94010 **800-228-3411.**

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(174) PRINTERS

3 PRINTERS, excellent condition! DEC-PRINTER III LA120RA, 180CPS, Diablo 630 w/forms tractor, Dataproducts M-100L dot matrix. Buy one or all 3, call **216-321-0626. 3-76**

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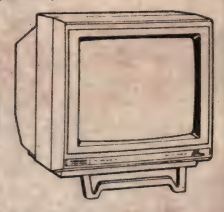
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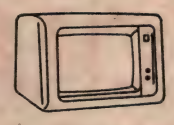
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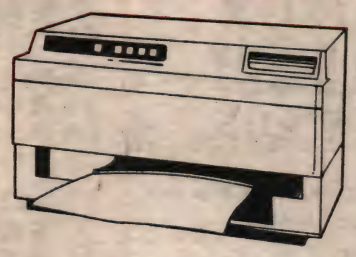


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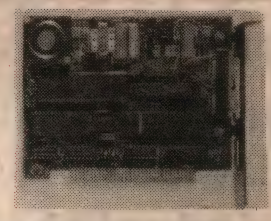
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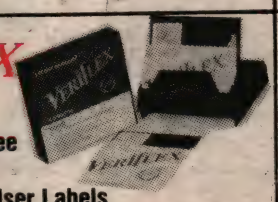
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3½" SS	$1.69	$1.64	$1.57
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SONY



Boxed diskettes	50+	100+
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1 800 USA FLEX

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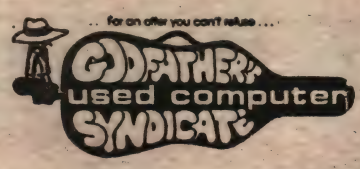
For Sale: 1 GDL Graphics Board A-1000 with 8088 processor S-100, 128K $500; 1 Zenith 13" RGB ZU136-long persistance Monitor, $450; 1 Qume 102-A Terminal $350; 2 Compu-Pro RAM 17 (64K) $250; 1 Compu-Pro Disk 2/channel select $400. **Cal Coastal,** 5 East Gabilan Street, Ste. 2318, Salinas, CA 93902. 2-76

Houston Instruments DMP-40-Z plotter. RSX232 interface, $560. DMP-29 plotter, RSX232 interface, $1200. **714-627-7411 Ken.** 2-75

Interface Kit for Diablo or Qume printers RS232 or Parallel. $95. Parts for Qume and Diablo HyType I: Repairs, cases, power supplies. **Digital Search 803-877-9444.**

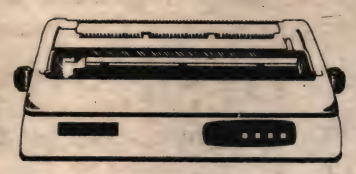
KEYBOARD $89.95; Sheet-Feeder $99.95 for Brother15/Comriter/Dynax15 printers. $5 shipping. VISA/MC add 4%. **Kyntek Marketing,** Po Box 13070, Minneapolis, MN 55414. **612-379-1020.** 3-76

LETTER QUALITY, Daisy Wheel, wide carriage, friction & tractor, RS232C, Teletex TTX-1014, like new, $350. Centronics 152 Dot Matrix. 150 CPS, wide carriage, friction & tractor, compressed and expanded modes, buffer, RS232C, perfect, $275. 80 Column dot matrix, 120 CPS, expand and compress, tractor, RS232C & Centronics interfaces. Base 2, model 800, $90. **Russ, 408-251-7070.** 3-75



$$$$ I Buy, Sell & Trade printers. **Godfather's Used Computer Syndicate,** PO Box 3037, 1154 W. SR 436, Forest City, FL 32714. **305-774-1111.** 3-76

Printer Liquidation!

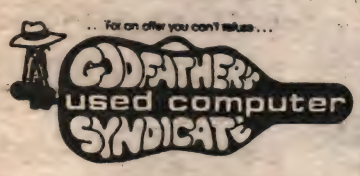


40 CPS Wide Carriage, Daisy Wheel, Letter Quality Printer

80% OFF

$349

C. Itoh model F10-40 (made for Commodore)- Diablo 630 compatible, 40 CPS, centronics, parallel interface, 2K buffer, bi-directional, optional sheetfeeder and tractor feed. For more information on this and other super bargains, see ad index for **BCE** display ads.



$$$$ Toshiba 1350 for $899 like new. NEC SpinWriter #5510 with tractor, ribbon & thimble never installed, like new $1499. **Godfather's Used Computer Syndicate,** PO Box 3037, 1154 W. SR 436, Forest City, FL 32714. **305-774-1111.** 3-76

Mannesman-Tally model MT140/OEM TO425 brand new in box, 132 characters, 160 CPS, with tractor feed $300. With NLQ option $350. Call **Rick,** after 6:00 pm CST. **615-832-8420.** 4-77

Multi-Strike IV ribbons fits Qume 9, 10, 11, Abati + Apple LQ, DEC LQP-02 $36/dozen. **Len 212-777-4353.**

NEC Spinwriter: Model 3515, letter quality with forms tractor. 40 CPS, LIKE-NEW, with serial interface, Extra thimble and documentation included $460; Diablo-630 serial, 45 CPS, with LQ Sheet Feeder, extra wheels & full documentation $860. **Skip Lightsey,** 303-665-7858 (evenings).

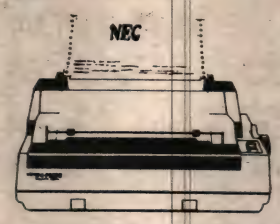
6-PEN PLOTTER. National/Panasonic A4 plotter with paper feed option. Store demo $595. **K & K Systems, 612-475-1527.**

Okidata 80 CPS, 7x9 DOT Matrix, friction feed, 10 characters per inch, 6 or 8 lines per inch, built in self test, new ribbon, 60 day guarantee. Removed from service, parallel interface $99; Tractor feed three with printer. **Cascade Electronics,** Route 1, Box 8, Randolph, MN 55065 **507-645-7797.**

Okidata ML83A printer. Excellent Condition $300. **Paragon Computer Corporation 203-525-0389.** 3-76

Panasonic KXP-1090, Centronics, 80-CPS, 100% Epson compatible, less than 1 year old. A real workhorse in excellent condition for only $125 (firm); I pay shipping. **Gary Smith, 615-885-3831,** after 6pm CST, no collect calls.

Printer Liquidation!



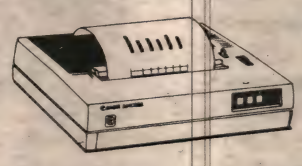
NEC NLQ Printer

70% OFF

$149

NEC-PC-PR103A-near letter quality dot matrix, 80 characters per line, 92-110 cps draft mode, 46 cps near letter quality, friction and tractor feed, centronics, 8-bit parallel interface, 10" carriage. For more information on this and other super bargains, see ad index for **BCE** display ads.

Printer Liquidation!



Canon Color Ink Jet Printer

72% OFF

$199

Canon PJ 1080A Ink Jet printe-37cps, 640 dots per line, 7 striking colors, can be used for overhead projections. Works wil all standard IBM graphics packages. For more information on this and other super bargains, see ad index for **BCE** display ads.

TTX1014 Cut sheet feeders, $69.95. Fits Swintec, Nakajima Olympia Electronic R.O. **415-829-4976.** 3-83

Texas Inst 810 RO Basic printer 150 cps, 1K buffer, RS-232 $450. **Len 212-777-4353.**

Tractor feed for Microline 80 or Microline 82. ne win box $35. **Cascade Electronics,** Route 1, Box 8, Randolph, MN 55065 **507-645-7997.**

WANTED: EPSON, Prowriter Dot Matrix printers. Please describe types, conditions, extras (manuals, buffers, tractor feeds, stands, etc.) prices. **Williams,** 2011 Crescent, Alamorgordo, NM 88310. 12-76

WANTED IBM Selectric 50 or 60 printer with TRS-80 III interface. **408-335-3209.** 3-77

WANTED: OKIDATA SL125 or SL160 printers, broken or working, we pay shipping. **614-436-8080.** 11-76

(178) TAPE DRIVES

APPLE 9-TRACK TAPE DRIVES — Read/ write standard ½-inch, 800 BPI, IBM compatible tapes on an Apple. Exchange data with minis and mainframes. Backup floppies and hard disks. $1000-$2100. **Electrovalue,** Box 376-C, Morris Plains, NJ 07950. 201-267-1117. 8-78

IBM-PC 9-TRACK TAPE DRIVES

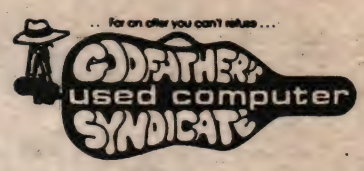
Electrovalve Industrial, a pioneer in providing industry standard 800 BPI 9-track tape drives for the Apple (see article, April Computer Shopper, p. 46) now has a product for the IBM-PC. Exchange data with minis and mainframes. $1000-$2100. Call for brochure. **Electrovalue Industrial Inc.,** Box 376-CP, Morris Plains, NJ 07950. 201-267-1117. 7-77

½" Mag Tape drives. New and used. Wanco 7" & 10" from $150 to $450 each. **Digital Search 803-877-9444.**

(180) CRTS, MONITORS

12" GREEN screen monitors, never used, distributors surplus, orig. $89. Pay only $39 plus shipping. **Rivendell, 603-783-4708.3-75**

LEAR SIEGLER ADM CRT, Excellent condition! Best offer, call **216-321-0626.** 3-76



$$$$ Super Hi-Res RGB Toshiba monitors manufactured for IDS with swivel/tilt stand and cable for $320 delivered. Pitch .31' - .39', 500-700 dots horizontal - 400 vertical dots with Hi-Res board, 8 colors. **Godfather's Used Computer Syndicate,** PO Box 3037, 1154 W. SR 436, Forest City, FL 32714. **305-774-1111.** 3-76

Micro-Term Ergo-4000 Terminal 80 col. x 66 line-full page, fuly programmable, 15 function keys, printer port, documentation. $400. **Len 212-777-4353.**

(181) CRT TERMINALS

TELEVIDEO 914 terminal, new, $350. 920C, used $95. 925, used, $290. Plus shipping. **301-498-0121.** 4-76

TELEVIDEO TS-801 computer, two 5.25 inch drives, one 8 inch drive (yes, that's right) $499. TV925 CRT $220. Spare keyboard $35. Personal terminal with phone option $195. **K & K Systems, 612-475-1527.**

TeleVideo 912 - smart terminal, many attibutes; 2 pages memory; numeric pad; printer port; in original packaging. **must sell** $225. Call now **404-447-4731** leave message or write: **George Sipe,** 4873 Scotts Mill Way, Duluth, GA 30136.

★ ★ ★

Televideo 925 terminals-these units are not working but may be used for parts. Will be sold "AS IS." Call **BCE 202-944-3900.**

(182) TERMINALS

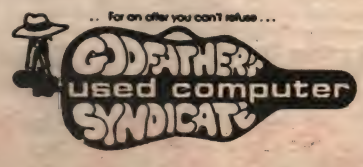
1983 A.D.P. Tele/Terminal 1700, Best Offer. **J.A. Miller Jr.,** PO Box 431, Winter Haven, FL 33880. **Tel. 813-324-4793.**

ADDS Viewpoint Ergo with original 90-day warranty. $375. **Digital Search 803-877-9444.**

AMPEX D175 terminal (unused) $100. Also unit for spare parts $25. **Richard Seale,** 303-449-4897/443-4681. 4-76

Beehive CRT's and parts for sale, rent or lease. Repair exchanges also Cado beehives and cromemco 3102's. Superbee II's, B100, B300/400, B500/550, Microbee, DMIS DM20/30, DM83, DM3270, DM standards, ATL083, ATL3270, ATL004, and more. Call **Mark (916) 677-0355** 10-78

GREEN 14" EMULATES Viewpoint, ADM3A, HAZ1500, detached keyboard, small footprint, Mint $250. **Bob 516-921-1465.**



$$$$ Super Televideo 950 Terminals like new $299!! With 90 day warranty!! **Godfather's Used Computer Syndicate,** PO Box 3037, 1154 W. 436, Forest City, FL 32714. **305-774-1111.** 3-76

New NCR 7930 $824; Wyse 50 $490; Wyse 75 $630; Altos-II $790; Altos-III $630; Altos-IV $395. FC, CCR. **Call 813-442-9967.** 3-75

TELEVIDEO 925 Terminals. Excellent Condition. $320. **Paragon Computer Corporation, 203-525-0389.** 2-75

★ ★ ★

Televideo 925 terminals-these units are not working but may be used for parts. Will be sold "AS IS." Call **BCE 202-944-3900.**

USI Monitor green composite for Apple/IBM. Like New! $50. **Skip Lightsey, 303-665-7858 (evenings).**

WYSE 100 terminals. Never used. $150 each. **Sandy, 305-427-2298.**

WYSE 30, New $395. Adds Regent 25 $125. Lear ADM 21 $250. **Russ, 408-251-7070.3-75**

Wyse WY50 Terminals excellent condition. $350. **603-436-9174 eves.** 4-76

Portable Teleprinter: TI Model 765, with internal bubble memory and internal modem $90. **Skip Lightsey, 303-665-7858 (evenings).**

(183) MULTIBUS BOARDS

Interlan NI3010 Multibus Ethernet Board, New (list $1390) sell $950. **203-755-1180.2-75**

Multi-Bus Disk Subsystem includes: DTC Multi-Bus Host Adapter, DTC 1402E disk driver controller, Shugart SA-1004 10 MB, 8" hard disk drive, Shugart Sa-801 8" SSDd disk drive, removed from new, tested equipment $350 **Len 212-777-4353.**

Multi-Bus System includes: Electronic Solutions 9 slot Multi-Cage Microbar Systems DBC86 8086 CPU card, Microbar Systems DBR50 256k memory card, Central Data Corp. Quad serial interface, NEVER USED, $425. **Len 212-777-4353.**

RS232/RS 422 SBX351 Intel serial multimodule communications board $29; **Naked 8186** 16bit Mother board + 256K upgrade full specs $49. All orders + $3 UPS ($5 COD) **P & A Co.,** 29 Tee-Ar Pl.,Princeton, NJ 08540. 4-78

(184) MEMORY

16k Expansion cartridge for your Radio Shack PC-2 or Sharp PC1500. Chip has own battery for permanant memory $130. **Livingston & Associates,** PO Box 16571, Lake Charles, LA 70616. 4-77

64k upgrade, set of nine 4164 150 NS chips $4.75. SASE **Sam Weiss,** 2510 Steele Rd., Baltimore, MD 21209.

EPROM eraser $49. **PCS,** Box 2376, Los Gatos, CA 95031. **408-559-1568.** 4-77

(186) MODEMS

ANDERSON JACOBSON, AJ1259, excellent condition! Best offer, call **216-321-0626.3-76**

Datacom management Sciences SP-25-MV RS-232 Test Set, built in PS, DVM, Breakout Box, Rack mount $795. **Len 212-777-4353.**

FREE! SHOP by Modem! Call our innovative electronic shopping center, **Fantasy Plaza,** by Modem (818)840-8066. 11-79.

GENERAL DATACOMM 2400ASM (2400 baud) modems. Two in perfect condition, $1000 or best offer. **Mort at 305-866-8631.** 3-75

General Datacomm 9600 Modems (PC card) (4 pcs) $750 ea. GDC 2020 Short haul modems (PC card) (11 pcs) $150 ea. Card cage w/power supply (2 pcs) $250 ea. **Len 212-777-4353.**

HAYES SMARTMODEM 300 baud Hayes modem $50. **Richard Seale,** 303-449-4897/ 443-4681. 4-76



1200 bps Modem Liquidation

64% OFF

$159

US Robotics Password Modem-autodial-autoanswer; works with Crosstalk, PC-Talk, and most other telecommunications software; works with IBM, Apple, Kaypro and all other ASCII standard computers and terminals, RS-232C Male/Female Interface. For more information on this and other super bargains, see ad index for **BCE** display ads.

20 Meg Winchester by Rodine, full height ST-506 interface **$350**
Controller for CPM (Z-80) systems ST-506 interface any size drive **$325**
Cabinet with power supply for two Shugart wide drives **$100**
SA800-2 Disk Drive guaranteed **$59**
SA850 Disk Drive guaranteed **$99**
SA800 repair, plus parts **$20**
SA850 repair, plus parts **$30**
Keyboard by Microswitch, 113 keys, 8 bit ASCII output with case **$40**

CASCADE ELECTRONICS

ROUTE 1, BOX 8
RANDOLPH, MN 55065

FREE SHIPPING ON PREPAID ORDERS

507-645-7997

COD ADD $3 — CREDIT CARD ADD 5%, MN ADD 6%

Micom 828 Data Concentrator (8 ch Multiplexor-Rack mount) $850. **Len 212-777-4353.**

Novation Auto-cat MODEM: 300 baud, auto answer and originate, external modem, RS-232 interface, LIKE NEW $50. **Skip Lightsey, 303-665-7858 (evenigns).**

PC/PCjr. New/Used accessories -All types (2nd drives, racore DMA, modems, etc.) national listing. For info send SASE to: **PC Database,** 260 N. Lincoln Way, Galt, CA 95632. 4-77

Racal-Vadic Modems-VA 1616 Chassis with (2) 3467 Ans Only Triple Modems (2) 3481 orig/Ans Triple Modems (2) 2010 Power Modules $1200. **Len 212-777-4353.**

UDS 212 A/D

(8) UDS 212 A/D auto-dial, auto-answer. List $545, sell $350. (8) UDS 212A auto-answer, sell $295. Includes full Documentation. Made by Universal Data Systems and serviced nationally. Both have built-in self-diagnostics (both Local and Remote). Bell 212A and 103 Compatible @ 1200 Baud and 0-300 Baud. Software is built into the modem and dialer can be operated from a Remote Dumb Terminal or any Computer with an RS-232 Communications Port. Truly amazing and in Like-new Condition. Call **Springfield Computer Systems, Inc. 904-354-0291** in FL, or **800-624-5999. 4-76**

Western Electric 208A 4800 Baud modems, used, $150. **Len 212-777-4353.**

halcyon 802A Data link monitor portable/rack test set- RS-232, sync or Async, 50 - 56K baud, 7" CRT, (No Tape) Good Cond., w. manual, asking $2200. **Len 212-777-4353.**

(187) WORD PROCESSING

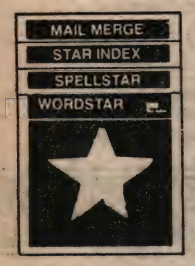
Electronic Data Entry! Let a computer "put it on the computer." Printed material (books, magazines, etc). ALL Typewriter styles. 200 Disk formats. **Data-Scan,** Po Box 6948, Athens, GA 30601. Phone: **404-353-7423.**



Attention Wordstar Users! Up to 60% off:

For Apple II, II+, IIe

Spellstar - correct spelling from 20,000 word disctionary. **Starindex** -creates alphabetized indices and tables of contents. **Mailmerge** - merges files for personalized form letters; assembles mailing labels. Any single package -list price is $99, our price is $75 (25% off). Combination of any two different packages -list price is $198, our price is $99. (50% off). All three packages -list price is $297, our price is $119. (60% off). Call **BCE,** 7 days a week, 24 hours a day. **1-800-545-7447.** See ad index for other BCE bargains!

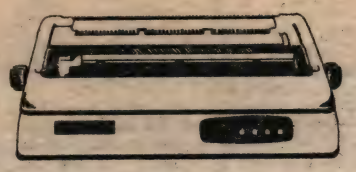


Attention IBM Wordstar Users! Up to 65% off:

For IBM PC and Compatibles

Correctstar (updated Spellstar) -corrects spelling from 65,000 word dictionary; offers alternative words. Just type a word the wat it sounds and Correctstar will find the correct spelling. (Note: program requires 192k RAM). **Starindex**- creates an alphabetized indices and tables of contents: **Mailmerge**-merges files for personalized form letters; assembles mailing labels. Starindex- list price is $99, our price is $75 (25% off); Mailmerge-list price is $99, our price is $75 (25% off); Correctstar-list price is $145, oru price is $75 (64% off); Package of Mailmerge and Starindex-list price is $198, our price is $99 (50% off). Package of Correctstar and Srarindex or Correctstar and Mailmerge-list price is $243, our price is $99 (60% off). All three packages-list price is $343, our price is $119 (65% off). Call **BCE,** 7 days a week, 24 hours a day. **1-800-545-7447.** See ad index for other **BCE** bargains!

Printer Liquidation!



40 CPS Wide Carriage, Daisy Wheel, Letter Quality Printer

80% OFF

$349

C. Itoh model F10-40 (made for Commodore)- Diablo 630 compatible, 40 CPS, centronics, parallel interface, 2K buffer, bi-directional, optional sheetfeeder and tractor feed. For more information on this and other super bargains, see ad index for **BCE** display ads.

WordStar Professional

80% OFF

• WordStar • SpellStar
• MailMerge • StarIndex



+

Appli-Card CP/M Board



For Apple II, IIe, II+ $169

The package includes **Wordstar** version 3.3, Spellstar, mailmerge, and Starindex. Also included is an **Appli-Card CP/M board** (made by PCPI, also sold as Starcard). Runs CP/M 2.2, Z80B, 6 MHz, 70 column display without 80 column card (80 column display with 80 column card). One year manufacturers warranty. **Wordstar Professional and Appli-card** -list price is $870, our price is $169 (80% off). **Wordstar Professional** - list price is $395, our price is $139 (65% off). **Appli-Card CP/M Board** -list price $475, our price is $119 (75% off). Quantities are limited: to order call **BCE,** toll free 7 days a week, 24 hours a day. clas 187
1-800-545-7447. See ad index for other super BCE bargains!

(188) MISC. EQUIPMENT

3M DC300 XL Data Tape Cartridges (new) $10 each. **203-755-1180.** 2-75

Biomation K-100D Logic Analyzer 100MHz Sixteen or 32 channel input, 1024 word memory. Time and data domain analysis, resolution 10ns, minimum pulse width 5 ns. Two qualifiers. Search and compare modes. CRT display, fixed TTL, ECL and 2 variable thresholds to -6.4 V and + 6.35 V. Good cond., w. manuals, but less probes. $1950. **Len 212-777-4353.**

CEI Dual Floppy Power Supply: 115 Watt, compact size, Model FD203, has +12, −12, +24, +5, −5 Volt supplies $75. **Skip Lightsey, 303-665-7858** Evenings.

Computer Products Corp. Rimfire 44 Multibut Tape and Disk Controller board, New (list $2995) sell $1500. **203-755-1180.** 2-75

DATA I/O PROM programmer with UniPak, $1500. Remex high speed paper tape recorder/punch, $500. Biomation logic analyzer, $500. Call **Ralph, 714-891-2363.2-75**

★ ★ ★

Dynatel Telesurveyor for Sale: Many leads daily with fast error - free results. Huge profit potential on this surveyor system. **813-625-3070,** Box 3687, Port Charlotte, FL 33952

★ ★ ★

UHF TV Decoder for Sinewave over the air subscription TV. Model Beta 2. Completely assembled and tuned with a lot of related documentation $100 OBO. **215-782-1452, evenings.** 2-75

For Information about space and NASA call the L5 Minessota BBS 300/1200 baud. **612-920-5566** (The Active Space Organization)

Free, Wholesale catalog of computer supplies. Direct from manufacturer. Send $1 post + handling to: **Bargains,** Box 5263, Balto., MD 21224.

HELP

Wanted To Buy: Burroughs Self Scan Displays and Nixies. Call **Jan Rondo Electronics Inc., 201-782-7814.** 4-77

ITT TELEPHONES 6-button phones, $30. Phone headset $50. **Richard Seale,** 303-449-4897/443-4681. 4-76

Keyboards. Microswitch. 74-key, Hall-effect, high quality. Parallel ASCII. New-$45. Used-$25. **Digital Search 803-877-9444.**

Lottery Program package picky, lotto type (60F36), Statistics (your data); expandable run on any basic system $19.95. **A & A Service,** Box 61, E. Wareham, MA 02538.

Motorola M68K Development System New PC Boards: VME4000 interface (list $395) sell $200. VM03 68010 processor Board (list $3995) sell $2500. VM11 RAM Board, ½ MB (list $2700) sell $1500. **203-755-1180.** 2-75

POINT-OF-SALE

(4) Complete Point-of-Sale setups. High Quality Units in excellent condition include Slip Printer and Cash Drawer. Works from any parallel printer port on PC or mainframe terminal. Operates using simple HEX Codes. Includes full Documentation. Slip printer is flat-bed type and will print any size receipt 3"x5" or larger. Can print 40 characters per line normal, 20 CPL in Expanded Print, and inverted (up-side-down) in both normal and expanded print. Includes all cables and documentation. $750 per setup. Call for more information. **Springfield Computer Systems, Inc., 904-354-0291** in FL, or **800-624-5999.**

SEEQUA CHAMELEON (IBM compatible) mother boards, blank (rev. 'J' or 'M') masked, $1.50 each; socketed easy board w/TTL IC's (rev. 'I') $8.00 each, earlier rev's $5.00 each; schematic set (16 pp.) $2.00. Minimum order $10. **GB Consulting,** PO Box 83, Laurel, MD 20707. 301-498-0121. 4-76

Uninterruptible power supply El6ar 30 minutes 12.3 Amps. New $5500, Sell $1500. **509-624-5235. Gary R.** 4-80

(189) BOOKS, MAGAZINES

★ ★ ★

Book Sale! Send for large list of computer and electronic books. **Bruce Sugarberg,** 1415B DeWitt Drive, Akron, OH 44313.3-76

COMPUTER USERS join the REAL computer revolution! With "Hooking In: The Underground Computer Bulletin Board Workbook and Guide." Your key to FREE: software, inside info, computer dating, shopping, electronic mail, x-rated dialogs, fun, games. Includes 1000+ current phone numbers to call with your computer. Only $9.95. Free Information. **Computerfood,** Box 608C, Oracle, AZ 85623. 3-76

DISK SERVICE MANUAL, DISK DRIVE TUTORIAL, PRINTER - PLOTTER MANUAL, COPIER MANUAL, COMPUTER PHREAKING, SUPER REINKING METHOD - More!! See enclosed display advertisement. Information ($1): **Consumertronics Co.,** Attn: Computers, 2011 Crescent, Alamogordo, NM 88310. 12-76

DOZENS OF Computer and Electronics books in Excellent condition for wide range of interests at bargain prices. Send SASE to **D. Schiller,** POB 1339, Culver City, CA 90232. 3-76

Eight books on computers worth $80+ sell for $20 plus postage. Write **Mendez,** 749 Glen Ridge Rd., Key Biscayne, FL 33149.

FOREIGN COMPUTER MAGS. Large list of addresses of publishers. Around 100 titles from all over the world. Send $3 to: **F. Engelberts,** Box 1422, 2970 Emden/W. Germany. 3-76

Money just waiting for YOU in newspaper clippings. Complete course $4 - Opportunity knocks will YOU answer? **The McGuire Company,** 7001 York Road, Baltimore, MD 21212.

Tab Books ½ price most titles stocked. Robot books specialty. Postpaid with check. Refund if not in stock. **Interface,** Box 3040, Laurel, MD 20708. 2-75

Tubodos Made Easy 198 pg. Guide to this versatile Multi-user Operating System. Pub. 1984 @ $24.95. Special offer--$8.50 pp. Quantity pricing Avail. **Len Dworkin,** 874 B'way, New York, NY 10003.

(190) MISC. LARGE SYSTEMS

★ ★ ★

All used products over $100. Buy/sell through nationwide listing service. **NO CHARGE** for buying direct from owner. **NO RISK** for sellers - 6% commission when successful. Open 24 hours if you have a touchtone phone. **203-762-8677.**

COMP-USED

85 Rivergate Drive, Wilton, CT 06897. 3-76

CONTROL DATA 9448 cartridge model drive 16MB fixed, 16MB removeable. In original crate. Never set up. W/Extras, $2000. Call **Dave 301-398-7340.** 3-75

INTEL INTELLEC MDS800 Development system. Dual disc drives and ICE-51 emulator. Software includes 1515-11, credit, PLM80, and ASM80. All documentation included. Make offer. **Rich, 619-741-9919.3-78**

INTEL MDS230, 64K RAM, dual double density diskette drives, single density drive, 8085 & 8086 development sfw., $5000. ICE86, $1500. Call **Ralph 714-891-2363.3-75**

(191) CP/M SOFTWARE

1000's of FREE SOFTWARE programs for over 80 computer formats including **IBM, CP/M & COMMODORE** from the **Public Domain Users Group.** Over 5900 members worldwide. For information send SASE to: Public Domain Users Group, 1442-C2, Orange Park, FL 32067. 1-75

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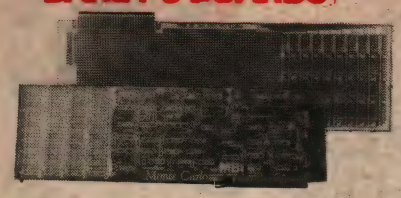
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DISC CONTROLLER +GAME I/O. A very compact ⅓ sized card that has two game ports and runs 1-4 drives. 100% compatible with all assembly data.....$19.95

MULTIFUNCTION CARD** The older style with only 256K RAM On board with Serial, Parallel ports, Clock, Calendar. A very good style card on sale while they last, this is a copy of the earlier AST 256K multifunction cards. Complete with all assembly data.....$19.95

384 RAM*** RAM only in close array, 384K of 64K RAM ideal for economy enhancement of system capacity. With all assembly data.....$19.95

512K CARD*** Another very economical expansion card. Takes 64K RAM In close array. With all assembly data.....$24.95

KRAM CARD*** We took a 512K card and rewired it for 256K RAMS. It now has four times the memory or 2 MBYTES. It closely follows the function of the popular JRAM card as all this type do, and also shares partition ing parameters to the extent that it will run the JRAM software or other similar programs. RAM Disc Drives are very easy to delineate. With all assembly data.....$34.95

PROTOTYPE CARD. 100% WW holes with DB-25 and DB-9 footprint on end.....$24.95

MEMORY PROTOTYPE CARD. This unique card has a memory array at one end. 36 16 pin sockets are placed in copper on board with all bussing in common, but with CAS, RAS etc brought out row by row and column by column so that either 64K or 256K RAMS can be quickly wired in. A 0.1 bypass cap is on each IC as well. The remaining ¾ of the board is 100% WW holes with a DB-25 and DB-9 footprint on one end.....$24.95

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A ¼ size card with two serial ports on board.
.....$14.95

PARALLEL PRINTER CARD. A ¼ size card with a complete IBM std centronics printer porton board, with all data.....$14.95

GAME CARD. A ¼ sized card with two game ports.
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DISC CONTROLLER + PRINTER CARD. Runs a parallel centronics printer and 1-4 drives. With all data....$24.95

PIA CARD. A fully locatable dual port PIA card. The two ports are DIP Switch programmable anywhere.....$19.95

PIA + PROTOTYPE CARD. Same as above by a full sized card with WW holes and DB-25 and DB-9 footprint
.....$24.95

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HARD DRIVE



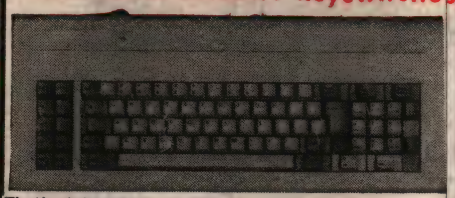
SWITCHING 75 watt SUPPLY

+5VDC @ 5.5A +12VDC @ 4A −12VDC @ 0.3A

GREAT BUY ONLY $24.00

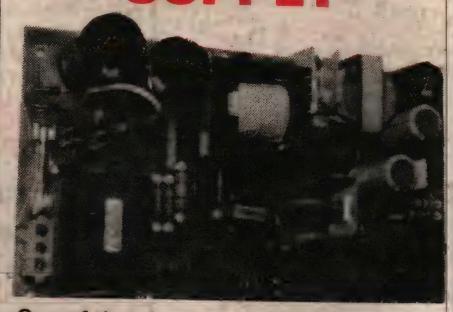
5150 KEYBOARD

With hi-rel CHERRY keyswitches



That's right folks, we were able to get a small quantity IBM type keyboards for a really low-low price. However they will only last for a few short weeks so order right now as we want ot move them real fast at only...$79.95

IBM POWER SUPPLY



One of the nicest open frame IBM type switching power supplies we have ever seen. Came from the defunct NCR IBM compatible, runs the whole thing, has +5V-7A, +12V-3A, -5, -12-¼A. A very good unit for starter system.

a real Steal at..... $39.95

NEW—640K

IBM® XT COMPATIBLE 8 SLOT MOTHERBOARD

BARE PCB With Manual & SCHEMATICS

$29.95

LAZY BOARD stuffed and wave soldered so you can save all that time soldering them up. All you need are the IC's memory, and BIOS and are set to go $389.95



WIRED AND TESTED

$179.00 OK

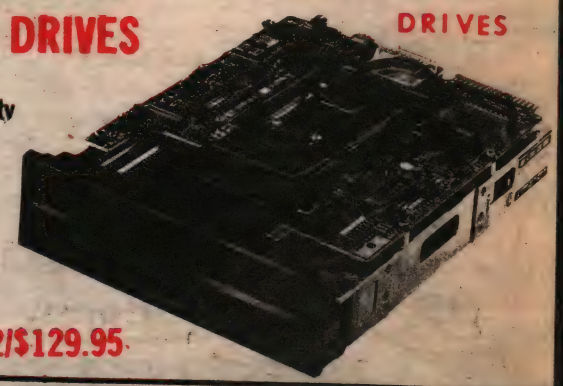
WITH BIOS

- 64K/128K EPROMS JUMPER SELECTABLE
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- 8087 MATH PROCESSOR, OPTIONAL
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- 4 DMA AND TIMER CHANNELS

WE'VE GOT THE NEW QUMETRAK 142 DRIVES

REAL IBM DRIVES

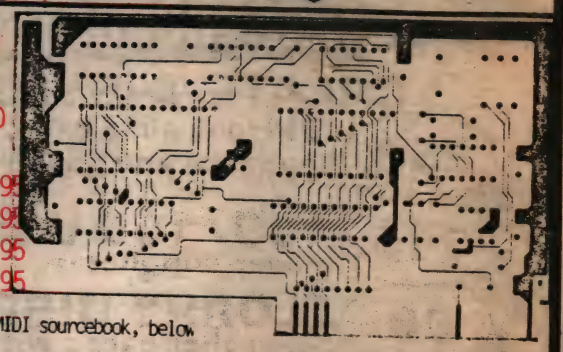
- Double Sided Double Density
- ½ Height • 48 TPI
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$69.95 Each 2/$129.95

MIDI INTERFACE CARD

BI-DIRECTIONAL MIDI CARD



BARE APPLE PCB & DATA	$14.95
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All wired cards come with the MIDI sourcebook, below

MIDI is an acronym for MUSICAL INSTRUMENT DIGITAL INTERFACE, and is a powerful standardized interface for most modern synthesized instruments. It has been adopted by both the USA and Japanese synthesizer industries.

THE MIDI SOURCEBOOK, comes in very handy for the musician who needs data on how to program it how to build it, and what is wrong with it, a very useful book that comes with a program disk with many examples and utilities for the musician. Please specify Apple/IBM..... $19.95

HD SWITCHING POWER SUPPLY

185Watts, MADE IN THE USA by POWER ONE. This unit is BRAND NEW, NEVER USED, TESTED and very HEAVY DUTY. Fully enclosed, 13x5x2.5" with Push-on and screw terminals.....$49.95

+5V-25A
+12V-3.5A
−5V-1.0A
−12V-1.0A

IBM CASE

We have the nicest case of all the various competing cases, ask any friend who has bought someone else's case and then has seen ours. The lid is hinged with pushbutton access. The back is cut for 8 XT slots and it comes with all the case back inserts for cards, card guides, blind disc filler plates, standoffs, feet, screws, all for . $59.95

Please specify back or side cutour for power supply. **2 FOR $99.00**

We also have an IBM 8 Slot/6502 Board dual duty case for making IBM look-a-like 6502 systems $79.95

$59.95



640K PCB $25 with case

SWITCHING POWER SUPPLY



Another great bargain from PARTS GALORE, A small power supply switching style that give +5v-4A; ±12v 1A and -5v (adjustable) on a compact 4x8" open frame PCB. Cost Northern Telecom $50.00 when they bought 5000 pieces. We got em when a subcontractor went belly up for 10% of that price and we are selling em for

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AC power cable (3 Wire) for above.....$2.50

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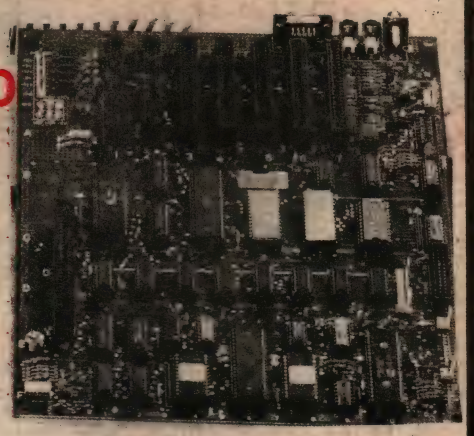
The famous APPLE-SEED and APPLE-SEED II are the books that see all, tell all on the various APPLE clone motherboards and peripherals. They are well worth the $12.95 that we are asking. And KOSMIC has been at it again on IBM clone motherboards and peripherals and has composed the one and only "BIG BLUE SEED", it goes into greater detail on a smaller number of motherboards and peripherals (over 20 and growing) and will help you to build many of them at a saving.

APPLE-SEED I Motherboard book.....$12.95
APPLE-SEED II Peripheral card book (over 75 cards).....$12.95
BIG BLUE SEED IBM peripherals and motherboards (over 50).....$14.95

CLONE MOTHERBOARD

WIRED WITH 64K

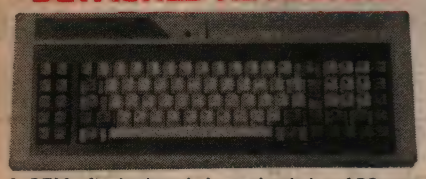
$199



Ext 80 Col Card WITH 64K RAM $45.00

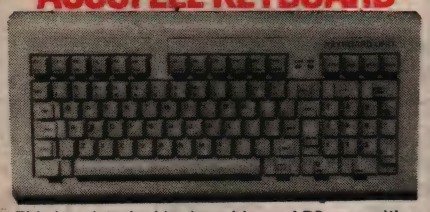
Yes, this is a clone of the ever popular II computer, it has no software on it and we will not sell you any. It is 100% compatible and uses custom IC's that are of original design to work-a-like the real thing and the character generator and the mapping PAL also do not infringe any copyright. It is plug-in-card compatible and will run ext 80 column cards with 64K RAM for total RAM of 128K as well as all other similarly compatible cards. We STRONGLY urge you to only use this board for personal non-commercial use. Those who try to sell quantities of systems based on this board will get in trouble with the fEDS, unless you have a legal source of software(like IIe upgrade kits). We will only sell a max of two of this board to any one person, unless shown legal access to software.

APPLE IIE® DETACHED KEYBOARD



A GEM of a keyboard, in a nice beige ABS case. Lets you build an IBM look-a-like that runs like a IIE with 2 drives in case using our $69.95 case on this page. This KB is fully IIE compatible, with all functions.....$149.95

MAK II ACCUFEEL KEYBOARD

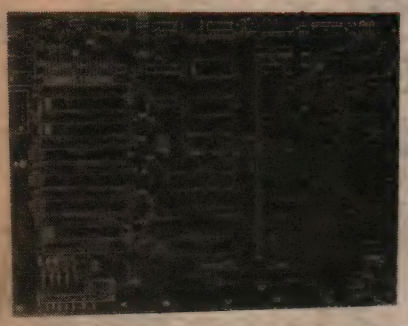


This is a detached keyboard in an ABS case with a 6" curly cord to connect ot to 6502 based machines. It used a serial data format for error free transmissions down the curly cord with a serial to parallel to converter board on the end that is fully 6502/ Apple compatible. Has auto repeat, beep, no beep. 10 user programmable macros, 50 preprogrammed macros, auto line number.

.....$149.95

FRANKLIN COMPATIBLE

MOTHER BOARD



100% IIe® Compatible, for those of you who wish to build a clone of the very popular APPLE IIe® . This board is a reverse engineered copy of the IIe® and is 100% compatible. We have the motherboard and the custom ICs only. All other parts are widely sold. The custom ICs are workalike chips that do not infringe any copyrights. The software for operating the board must be obtained elsewhere as we do not have it for sale. When we say 100% we mean it.

A very good buy at $49.95
Custom IC set(2) $49.95
Keyboard encoder (AY3-3600) $14.95
Character generator, U/LC $14.95

PARTS

100Ns delay line	$6.95	0.1 Mono caps, 0.2"	$0.10
7 Ns delay line	$9.95	0.1 Mono caps, 0.1"	$0.12
62 Pin edge conn	$2.00	50 Pf trimcap	$0.75
50 Pin edge conn	$1.50	2-3" speaker	$1.50
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1KX8 SIP	$0.59	2N3904	$0.29
2.2Kx9SIP	$0.79	2N3906	$0.29
10Kx9 SIP	$0.79	2N2222	$0.35
33 Ohm DIP	$1.49	2N2907	$0.39
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Ribbon Cable Type Centronics and DB-25 Connectors

DB-25 Male .....2.48 DB-25 Female 2.48
Centronics Male .2.98 Centronics Female 2.98

Disc Doubler



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3 WAY SWITCHED SCOPE PROBE



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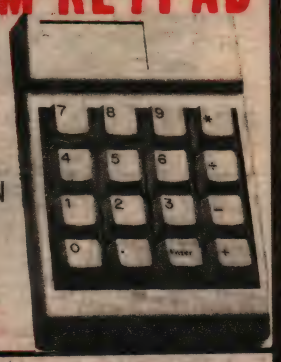
1 ×1 POSITION
DC – 10 MHz
35 nS
55 p.F. + Oscilloscope 'nput Capacitance
1 MΩ (Oscilloscope Input)
600 Volts DC Including peak AC,

2 ×10 POSITION
DC – 100 MHz
3.5 nS
Nominal 16 p.F.
10–60 p.F.
10 MΩ When used with oscilloscopes which have 1 MΩ Input.

3 REF POSITION
Probe tip grounded via 9 MΩ resistor,

IIe NUM KEYPAD

FITS REAL & CLONE BOARDS ADDS NUMERIC KEYS AS SHOWN



$34.95

IIe® ABS PLASTIC CASE

$49.95



This case is made to fit the Mother Board listed here for making IIe® clones and it makes a very nice looking copy. There is just enough difference to avoid design infringement. The case also has no brand names or other marks on it.

A good buy at $49.95

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MADE FOR TWO ½ HEIGHT DRIVES
SPACE FOR POWER SUPPLY,FAN ETC.

40 WATT POWER SUPPLY..$40.00
60 WATT POWER SUPPLY..$60.00

APPLE® BARE PC BOARDS PRICE SLASH!

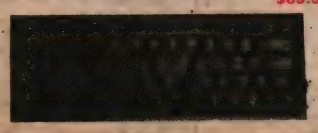
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GRAPHIC DUMP card, GRAPPLER compatible	$11.95
SPRITE ACTION GRAPHICS card for TI chip	$11.95
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SHORT APPLE PROTOTYPE	$9.95
RGB CARD for APPLE, TTL output	$18.95
RGB card Mapping PROM	$9.95
DISC PROMS, set of two	$11.95
80 Column EPROMS, Set of 3	$16.95
Z-80+ EPROM	$9.95
MODEM EPROM	$9.95
COPY EPROM	$9.95
GRAPHIC DUMP EPROM	$9.95

IIe® MATRIX KEYBOARD

$69.95

This keyboard fits the above case and has 100% clone compatibility, it will allow operation of all IIe® commands. Another bargain at $69.95



ASCII KEYBOARD

8048



New Serial Parallel

$19.95

5v only

A great deal, this brand new ASCII keyboard came from AES DATA, one of the largest makers of word processors in the world. A novel circuit generates both serial and parallel ASCII out allowing use on both APPLE and IBM styles of system. The unit runs on +5V only, has Hall effect keyswitches and uses an 8048 micro for operation. The sculptured keytops are arranged in typewriter style for quick learning and are an attractive light beige color. We got them for 5% of the $169.00 that AES paid and so we can sell them dirt cheap and still make money. Completely new with 20 pin ribbon IDC connector and pinout for easy interfacing.....$19.95

IBM™ AT COMPATIBLE!

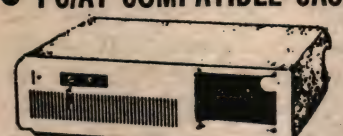
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- ROM BIOS Included
- 8 I/O Slots
- On Board Clock
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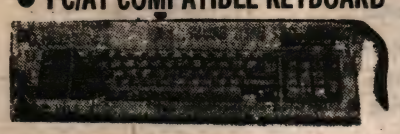
● PC/AT COMPATIBLE CASE



- Complete corrosion-proof exterior
- Anti-electric conduct
- Include keylock assembly, drive rail, speaker holder and accessories for easy assembly.

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● PC/AT COMPATIBLE KEYBOARD

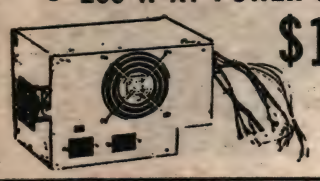


- MFG by Maxi-Switch
- 3 LED's

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● 200 W AT POWER SUPPLY

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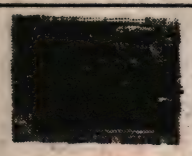
● FLOPPY & HARD DRIVE CONTROLLER



DTC CONTROLLER 5290 **$255.00**

MULTI I/O

$99.00



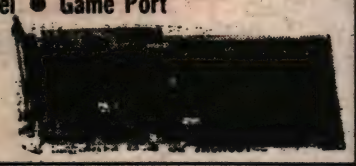
- Serial & Parallel Ports

SHORT CARD

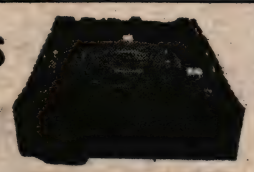
1.5 MB MULTI FUNCTION

- Expandable to 1.5 MB
- Serial
- Parallel ● Game Port

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360K - ½ hgt. DSDD	$69.95
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New V-20 CPU Mfg. by NEC replaces the 8088 in your system. No compatibility problem. New on market so order early before high demand makes these scarce!



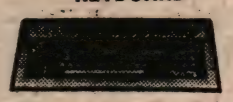
TAIWAN BASIC

Rub Basic in your IBM Clone out of EPROMS.

$39.95/per set

IBM CLONE HEADQUARTERS

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For AT or XT
Switch Selectable
5150 Type $79.95
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POWER SUPPLY



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$1479.00 20 MEG TURBO COMPUTER

A NO NONSENSE FULL BLOWN BUSINESS COMPUTER SYSTEM

- Dual speed (5 & 7 MHZ)
- Dual ½ drives (DSDD)
- 20 Meg. & Controller
- Parallel, Serial, Game, Clk/Cal.
- 640K Memory
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- 135W Supply



● DOS 2.1 Operating System ● Bundled Software
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IBM LOOK-A-LIKE CASE

- Slide-Off Cover
- Requires Side Switch Power Supply
- For Exact IBM Foot Print Boards Only
- 8 Slots in Rear

Case-60 ..... **$49.95**

HINGED TOP CASE

- Flip top case
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- Fits all clone boards
- 8 slots in rear

Case-50 ..... **$49.95**



INTEL ABOVE BOARD CLONE
2 MEG EXPANDABLE
$235 W/OK

MODEMS

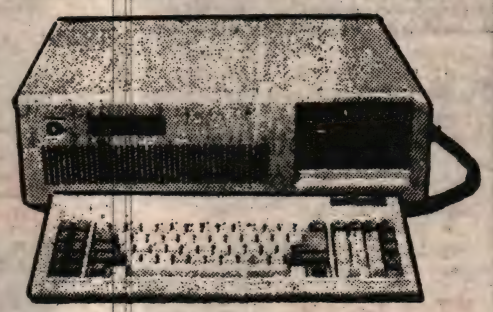


103/212A —
Operates at 300 baud and 1200 baud

- Bell 103 and 212A compatible
- Hayes compatible
- Auto Answer, Dial and Redial
- External speaker for monitoring calls
- AC Adapter supplied

INTERNAL	$159.00
EXTERNAL	$175.00

IBM AT CLONE COMPUTER



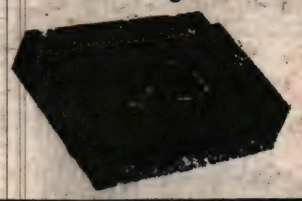
- 80286 Based System ● 1 Meg Memory
- Combination floppy — hard disk controller
- 1.2 Meg floppy drive & all cables
- 2 Serial, 1 parallel port, clk/cal
- 192 Watt power supply ● AT Keyboard
- Runs all major IBM Software
- Monochrome Card & Monitor

$2149

DSDD - 40 TRACK DISK DRIVES

Qume 142A	$79.95
Okidata GM33158	$84.95
Tandon 50-2	$79.95

All ½ Hgt.



MONITORS



SAMSUNG COMPOSITE MONITORS

12" Amber Composite	$69.95
12" Green Composite	$67.95

NEC COMPOSITE MONITORS

12" Amber Composite	$79.95
12" Green Composite	$74.95

RGB MONITORS

Roland 12" RGB	$325.00
NEC 14" RGB	$295.00
Cables for RGB Monitor	$9.95

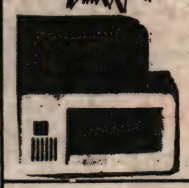


COMBO FLOPPY/HARD DISK CONTROLLER

Controls 2 floppy & 1 hard disk
5 to 100 meg. Stk. #FDC 550 ...$179.00

NEW

DISKETTE DUPLICATOR



Stand-a-lone unit will copy information from one diskette - track by track - to another diskette. No computer needed! Copies all format diskettes as well as all copy protected diskettes. Takes only 45 seconds to copy. Extremely easy to use.

$795

IBM ADD ON BOARDS



STOCK#	DESCRIPTION	PRICE
FDC-501	Floppy disk controller w/cable - 4 drives	$40
FDC-507	Floppy Cont. w/serial, parallel & clock	$109
HDC-515	Hard disk controller w/cables (Omti)	$139
VID-401	Color Graphics Cards, IBM Specs.	$70
VID-405	Magic Video card w/TTL, RGB, & Composite outputs 640x400 color, 640x352 monochrome	$185
VID-406	Monochrome (TTL) card	$75
VID-408	Hi-Res mono/graphics w/printer port Hercules compatible	$85
SIO-250	Serial port card (second serial opt.)	$35
PIO-255	Parallel printer card	$29
MFC-110	Short I/O, parallel, serial, clk/cal	$99
MFC-100	Multi-funct. w/para., ser., clk/cal & 384K Exp. No mem. installed. Software	$90
MFG-120	576K memory expansion board (short card)	$60
EP-128	EPROM burner board, for IBM (2716-27128)	$129
RD-2	Bus Receiver & driver boards for Exp. chasis	$149

EASY MEMORY EXPANSION



Memory expansion PROMS expand the memory on your IBM XT or Compaq to a full 640K on the motherboard. No expansion board necessary! Complete w/instructions.

Stk. #IBM-640P	$39.95
Stk. #COMPAQ-640P	$39.95

RAM TEST PROGRAM

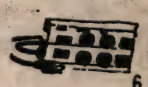


A must for all IBM clone assemblers. Tests full 640K of memory and prevents you selling computers with parity problems. Saves you money!

Stk. #DK-RMTST $9.95

SUPER SURGE HASH FILTERS

$15.00



6 Outlets, Fused, Mov. & LC Circuits

RAM CHIPS

4164-150	$.75
41256-150	$3.00

IBM CLONE TECH MANUAL!!

Did you buy a clone machine and didn't get any kind of operations manual? We put together an extensive manual that tells you how to hook everything up, how it works, & troubleshooting techniques. Covers both XT and Turbo-XT systems. Complete w/schematics.

Stk. #XT-Book $24.95

NEW IBM COMPATIBLE TEXAS ROM BIOS



A new 2 chip bios set that replaces the existing ROM bios on your compatible XT or Turbo-XT motherboard. These eliminate many timing, parity, & system errors. Also eliminates the occasional "hang up" problems in the Turbo XT boards. Runs all software for IBM computers.

Stk. #TX-BIOS2 .....$24.95

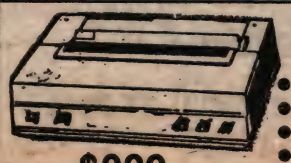
EXTERNAL DRIVE CASE & POWER SUPPLY



- 75 W Power Supp.
- Drive Power Connect.
- IBM Styling

$99.00

NEC 1105A



- 120 CPS Print Speed
- Tractor/friction feed
- Parallel interface
- IBM graphics compatible
- Narrow carriage

$229

LOLIR LECTRONICS CORP.

13933 N. CENTRAL EXPRESSWAY
SUITE 212
DALLAS, TX 75243
214-234-8032 — 214-234-8056

TERMS: Check, M.O. or MC/Visa. COD's add $1.90. Shipping add $3.50. TX Res. add 6-1/8% Tax.

master charge VISA

MORE COMPUTER SURPLUS BARGAINS

NEW TEXAS XT BOARD



NEW 4 LAYER BOARD

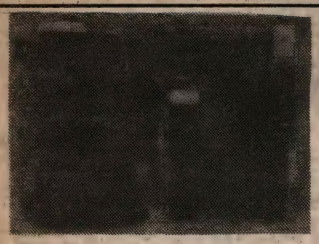
- 256K Standard (640K Max)
- 6.77 MHz Operating Speed
- Completely IBM Compatible
- 8 I/O Slots • IBM Footprint
- Tested w/256K

STK #XTurbo-640 ..... $235

IBM COMPATIBLE SOFTWARE

PC-Write—	Word Processor
PC-File—	Database Manager
PC-Calc—	Spreadsheet
PC-Desk—	Desk-Top Manager
Toolbox 1—	DOS Utilities
Toolbox 2—	DOS Utilities
Toolbox 3—	DOS Utilities
Games 1—	Arcade Games
Games 2—	Arcade Games
PC-Business—	Business Account
PC-Home—	Home Management
PC-Modem—	Modem Program

$3.75 PER DISKETTE



- 256K Max
- 8 Slot
- 4.77 MHZ Speed

$140 — W/OK

STANDARD XT REPLACEMENT MOTHERBOARD

HARD DISK DRIVES



20 Meg. CMI w/controller	$440
10 Meg. Miniscribe w/cont.	$340
20 Meg. only	$325
10 Meg only	$235
Controller w/cab.	$135

NEW PORTABLE HOUSING FOR IBM CLONES

- Keyboard
- Case
- 9" TTL Amber Monitor
- 135 Watt Supply

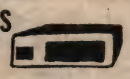


Similar in appearance to the Compaq Portable. Fits all standard IBM Footprint boards.

$625.00

NEED MORE SLOTS FOR YOUR IBM?

EXPANSION CHASIS FOR IBM'S



Case	$59.95
Exp. Board	$69.95
Power Supply	$69.98
Driver - Rec.	$149.00



SSDD

SHUGART 8" DISC DRIVES FOR XEROX 820 $65.00

XEROX 820-1



XEROX 820-1 Z80 SINGLE BOARD COMPUTER

- 64K RAM
- 80 x 24 Video
- Floppy disk controller
- 2 parallel ports
- 1 serial port

Asseembled & Tested $89.95

XEROX 1810 MOTHERBOARD

The 1810 is a portable CPM machine that never made it into mass production. These Z-80 Motherboards are becoming collectors items. These boards have on-board serial, parallel, video w/RF modulator, & 64K memory. Boards are solder line rejects and are missing some chips. ROM set included. Limited quantity so order early!

Xerox Xerox-1810	$39.95
CPM Boot Disk	$6.00
Power Transformer for 1810	$12.50

IC BARGAINS

LS00 ... $.15	LS123 .. $.42	LS240 .. $.60
LS01 ... $.15	LS124 . $1.40	LS241 .. $.60
LS02 ... $.15	LS125 .. $.30	LS242 .. $.90
LS03 ... $.15	LS126 .. $.40	LS243 .. $.80
LS04 ... $.15	LS132 .. $.40	LS244 .. $.50
LS05 ... $.15	LS133 .. $.25	LS245 .. $.50
LS08 ... $.15	LS138 .. $.35	LS251 .. $.45
LS09 ... $.15	LS139 .. $.30	LS253 .. $.40
LS10 ... $.15	LS145 .. $.55	LS257 .. $.45
LS11 ... $.15	LS151 .. $.40	LS258 .. $.50
LS12 ... $.25	LS153 .. $.30	LS259 . $1.00
LS13 ... $.30	LS154 .. $.75	LS260 .. $.40
LS14 ... $.25	LS155 .. $.40	LS266 .. $.30
LS15 ... $.30	LS156 .. $.40	LS273 .. $.75
LS20 ... $.15	LS157 .. $.30	LS279 .. $.30
LS21 ... $.18	LS158 .. $.40	LS280 .. $.80
LS27 ... $.21	LS160 .. $.50	LS283 .. $.35
LS30 ... $.15	LS161 .. $.40	LS290 .. $.65
LS32 ... $.20	LS162 .. $.60	LS293 .. $.75
LS33 ... $.25	LS163 .. $.35	LS298 .. $.65
LS37 ... $.30	LS164 .. $.50	LS299 . $1.50
LS38 ... $.25	LS165 .. $.80	LS322 . $2.50
LS42 ... $.30	LS166 .. $.75	LS323 . $2.25
LS51 ... $.20	LS169 . $1.00	LS364 .. $.90
LS54 ... $.25	LS174 .. $.35	LS366 .. $.40
LS55 ... $.20	LS175 .. $.35	LS367 .. $.40
LS73 ... $.30	LS181 . $1.25	LS368 .. $.30
LS74 ... $.23	LS191 .. $.80	LS373 .. $.50
LS85 ... $.45	LS192 .. $.70	LS374 .. $.75
LS86 ... $.19	LS193 .. $.74	LS375 .. $.35
LS93 ... $.50	LS194 .. $.60	LS377 .. $.90
LS107 .. $.28	LS195 .. $.50	LS378 .. $.80
LS109 .. $.20	LS196 .. $.70	LS390 .. $.80
LS112 .. $.30	LS197 .. $.75	LS393 .. $.75
LS122 .. $.35	LS221 .. $.50	LS399 . $1.00
		LS670 . $1.24

EPROM

2716	$2.00
2532	$2.75
2732	$2.25
2764	$2.75
27128	$4.50

BULK DISKETTES DSDD $.65 EACH



DATA SWITCH



This A-B switch lets you share your computer with any two peripherals (serial or parallel). All 25 lines are connected. Has one DB25 female input & two DB25 female outputs.

Stk. #AB25 ..... $39.95

MORE XEROX SURPLUS FOR 820-II

820-II Motherboard Tested $125

8/16 Processor bd. run MS DOS on your Xerox $85

SAMSUNG 12" TTL GREEN SCREEN MONITOR



REQUIRES 15VDC IN. TTL GREEN SCREEN

$19.95

TI COMPUTER FLOPPY DRIVE CABLES



SINGLE FLOPPY DRIVE CABLE

Cable is 15" long with 34 pin card edge & 34 pin header conn.

CFS-15 ..... $2.00 ea or 10/$14

DUAL FLOPPY CABLE

Cable is 34" long w/3 34 pin edge connectors.

CFS-30 ..... $4.00 ea or 10/$25

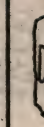
EPROM PROGRAMMER

Programs 2716-27512
Programs up to 4 EPROMS At A Time



Stk. #EPP-512 ..... $179

METAL FILLER BRACKETS FOR CLONE CASES



Plain	$.25
Video	$1
RS232	$1

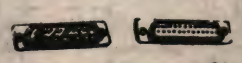
2ND SERIAL PORT CHIP SET

8250
1488 $7.50
1489



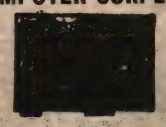
31/62 EDGE CONNECTOR FOR IBM CLONE BOARDS $2.25

Popular DB Series Computer Connectors



9 Male solder pot	$1
9 Female solder pot	$1
9 hoods	$.65
25 male solder pot	$1.25
25 female solder pot	$1.25
25 hoods	$.75

RADIO-SHACK COMPUTER SURPLUS



TRS-80 Mod III motherboards populated boards with all IC's except ROM & RAM. We have a ton of these to close out!

TR-3B damaged boards with hole or corner clipped ..... 3/$14

Mod III ROM set $20

Mod III RAM set $15

TANDY 2000 MOTHERBOARDS

Assembly line rejects. Circuit boards are undamaged. These boards are very repairable. No RAM, ROM or PROM installed.

Stk. #TRS-2000D $29.95

MODEL 3 KEYBOARD CAPS

A complete set of key caps to replace your lost or broken keys. 100 sets available.

Stk. #TRS-3KC $6.95/set

KEYBOARD SWITCHES

We have Radio Shack keyboard replacement switches to fit just about every model.

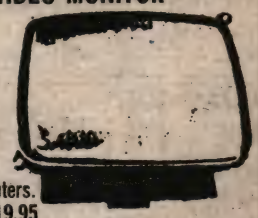
Stk. #TRS-SW ..... 2/$1.50

REPLACEMENT ANTENNAS

Replacement antenna for Tandy Radios. Fits many models.

Stk. #TRS-Ant ..... 3/$1.00

9" HIGH RESOLUTION (TTL) VIDEO MONITOR



NEW

Green Screen
12 VDC Required

Originally used in portable computers.

Stk. #964-02 ..... $19.95



MFG. BY ELSTON

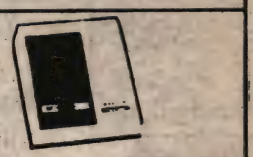
COMMODORE SURPLUS

12" GREEN SCREEN MONITOR

Composite video input built in power supply. Requires 18VAC XFMR.

Useable on IBM's $19.95

Transformer for above $3.50



BIZCOMP VERSAMODEM

Sends and receives at 300 baud selectable originate/answer modes. Full duples operation. Bell 103 compatible. Comes with AC adapter.

Compatible with all computers having RS 232 port $34.95

KAYPRO SURPLUS

KAYPRO EQUIPMENT

81 Series ROMS (K2) ... $7.00

Keyboard Siemens w/case $65.00

KAYPRO MAINBOARDS

K2 socketed (no ICs)	$27.50
K2 populated, tested	$129.00
K10 tested	$225.00
Pro-8 Upgrade kit	$39.00



EAGLE TURBO

IBM Compatable Surplus Motherboard



- 8086-2 (8MHz process)
- 128K Mem (512 Max)
- 8 I/O Slots
- Complete - not damaged
- Surplus from Eagle

$99.00

TI 99-4A SURPLUS



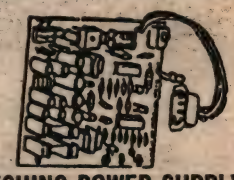
SOUND & VIDEO MODULATOR

TI #UM1381-1 — can be used with all video sources. Built-in A-B switch. Channel 3 or 4 output. Requires 12VDC power $3.50



KEYBOARD

PN 900181 — 48 keys. Measures 4"x9". Terminates to a 15 pin connector $3.75



SWITCHING POWER SUPPLY

INPUT: 14 VAC to 25.5 VAC.
OUTPUT: +12VDC @ 350MA.
+5VDC @ 1.2AMP



WALL PLUG ADAPTER

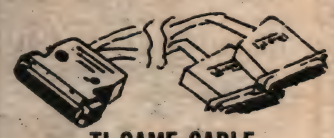
TN-21 — used with the above power supply. Output 21VAC @ 45VA.

TN-21 ..... $3.50 ea or 10/$19.95



CASSETTE INTERFACE CABLE

CIC-93 — has DB-9 connector on one side to 3 RCA phono jacks on the other end ..... $1.50 ea or 10/$10.00



TI GAME CABLE

CAB-15 — one end has a DB25 female going to 2 DB15 female connectors. Cable is 6' long $4.00

IBM PROTO BOARD ORIGINAL IBM $34.95

LOLIR LECTRONICS CORP.

13933 N. CENTRAL EXPRESSWAY
SUITE 212
DALLAS, TX 75243

214-234-8032 — 214-234-8056

TERMS: Check or M.O. COD's add $1.90. Shipping add $3.50. TX Res. add 6-1/8% Tax.

master charge VISA

214-234-8116 ELECTRONIC SURPLUS SPECIALS 214-234-8105

MACHINE PIN SOCKET



22 PIN GOLD PLATED SOCKET
5 pcs $1.00
Stk. #ICS-22M

$.75
ROCKER SWITCH
16 Amp On/Off
Used in Xerox 820 Computers



Full Wave Bridge
6AMP-300V
2/$1.00



MINI-TOGGLE SWITCH
5AMP DPDT
$.65 EA
10/$4.50

SNAP ACTION SWITCH



MICRO-SWITCH
ASS'T OF 10
$2.50
STK #500-10M

DISK DRIVE MOUNTING SCREWS
20 for 50¢

CIRCUIT BOARD BONANZA



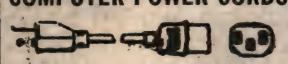
Soung generator boards removed from electronic pin-ball games. Contains oscillators, control circuits & 2 watt audio amp. Experimenters dream!!!
$2 ea — 10/$12.50 w/schematics

5V & 12V REGULATOR BOARD
Regulator board containing 5V & 12v TO-220 regulators, fuses, bridges, caps & I/O connectors. Size 2"x4" w/heatsinks.
REG-512 .....$3.50

RECTIFIER BOARD
Contains (4) 10 Amp bridges, (3) large filter caps, & I/O conn. Size 4.5"&8".
BRDG-4 ....$2.50ea or 10/$12.50

LINEAR & CMOS BONANZA
Circuit board removed from SINGER electronic calculators. Has 20 linear & cmos IC's & a wealth of other parts.
BD-20 ....$2.50 ea or 10/$12.50

COMPUTER POWER CORDS



$1.25 EA — 10/$10



12 VDC TOY MOTOR
Stk. #MO-12 ..2/$1.00

COMPUTER GRADE CAPACITORS



Ass't of 10
Stk#CCG-10 .....$2.50

CPM DISKETTE FOR USE WITH NEC V-20 PROCESSORS
$3.75

GOODIES!
Delta Design Table Top Temp. Chamber $100
Altos Computer $250
Sanyo CMP/M Computer $250
Xerox 820-11 Comp $550
Box of 50 pcs waveguide & antenuators $100

CALL FOR OUR NEW FLYERS



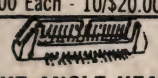
POWER SUPPLY
MFG. BY GENERAL INSTR.
INPUT: 110VAC
OUTPUT: +5VDC @ 5AMPS
+12VDC @ 2.5AMPS
−12VDC @ 3AMPS
PS-120 .....$24.50
Used is some Commodore comp.



WALL PLUG ADAPTERS
6VDC @ 300ma
$1.75 or 10/$12.50

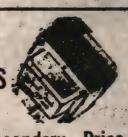


ISOLATION TRANSFORMER
117VAC:
117VAC @ 125VAC
MFG BY SIGNAL TRANS
$3.00 Each - 10/$20.00



RIGHT ANGLE HEADERS
40 Pin .....$.40
34 Pin .....$.50
10 Pin .....$.25

TRANSFORMERS



STK.#	PRI (VAC)	Secondary (VAC)	Price
TN-6.3	117	6.3 @ 300ma	$1.25
TN-12	117	12 @ 400ma	$1.35
TN-24A	117	24 @ 200ma	$1.25
TN-24B	117	24ct. @ 3.6 Amp	$3.50

HEAT SINK TO-3 $.25

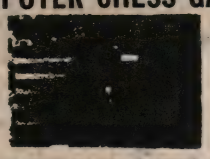


LOAR RESISTOR FOR IBM POWER SUP.
5 Ohm @
25 watts
$1.79
Stk# RIBM-5

APPLE III MEMORY EXPANSION BDS
$15.00
w/OK memory

DB-25 USED Connector Ass't
10/$2.50

COMPUTER CHESS GAME



MILTON BRADLEY CHESS GAME
Electronic circuit board removed from famous toy maker's game. Board has 6502 processor, 74LS series ic's, buzzer & many other useful components. Boards are complete and undamaged. MB part #7924243001.
BD-792 $3.95 ea. .....10/$24

Components Ass't Your Choice $2.75

Stk#	Description
CD-180	Ceramic Disk Capacitors 10 pcs of 18 different values. 180 pcs total
CE-180	Electrolytic Capacitors 10 pcs of 18 different values. 180 pcs total
CM-180	Mylar Bypass Capacitors, 10 pcs. of 18 different values. 180pcs total
TP-180	Miniature Trim Pots 10 pcs of 18 different values. 180 pcs total



COLECO JOYSTICKS
$2.50 EACH
10/$17.00

CRYSTALS



Frequency	Case	Price
4 OMHZ	HC18	$1.25
6 OMHZ	HC18	$1.25
8 OMHZ	HC 18	$1.25
10 7MHZ	HC 18	$0.75
14 318MHZ	HC 18	$1.25
18 432MHZ	HC 18	$1.25

VOLTAGE REGULATORS



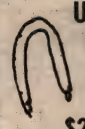
7805 5v 1.5 amp
7812 12v 1.5 amp
7824 24v 1.5 amp
7905 — 5v 1.5 amp
7905 — 5v 1.5 amp
7912 — 12v 1.5 amp
$.43 Each

LOW PROFILE SOCKETS (TIN)



# OF PINS	PRICE
8	$.08
14	$.10
16	$.12
18	$.15
20	$.18
22	$.18
24	$.20
28	$.25
40	$.30

ELECTRONIC PIEZO BEEP BUZZER
Special — 2/$1.00
7/8" Diameter element on plasting mounting. Originally used in Radio Shack telephone as the ringer.
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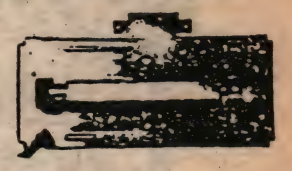
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8" DISK DRIVE POWER SUPPLY
Heavy duty supply can run up to 4 drives. Enclosed frame Iput 117VAC. Output: 5VDC @ 7 Amps: +24VDC @ 6 Amps. −24VDC @ 6 Amps.
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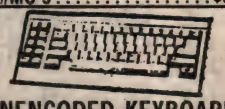
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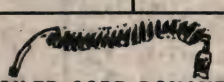


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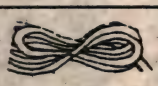


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Wir-30 .....100'/$2.50



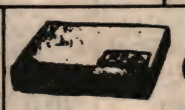
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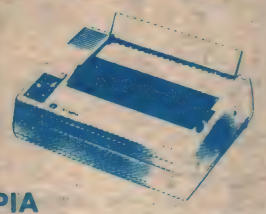
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ca computer accessories

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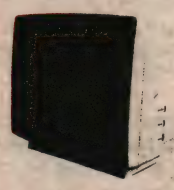
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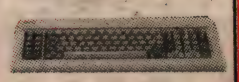
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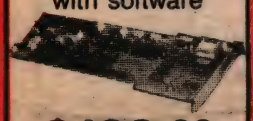
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DICTIONARY (#378) Dictionary type spelling checker.
IV-ED (#415) Word processor - editor
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FRED (#83) Screen editor similar to IBM's Personal Editor
RV-EDIT (#190) Full screen editor from Bob Vollmer.
FOIL EDIT (#347) Full screen editor top to bottom and left to right.

TEXT PROCESSING TOOLS

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FOGFIND (#378) reverses writing complexity using the "Fog index".
ROFFA 1.61 (#416) makes beautiful text formats with this processing tool.
QPARSER (#419) Public Domain version of this famous system.
WORDSTAR AIDS (#379) collection of the most useful utilities for the Wordstar user.

DATABASE PROGRAMS

PC FILE III (#5) most popular database progam from Jim Button
U—MIND (#133) Fast hashing makes this a dandy database. (Intelligent database)
DATABASE OF STEEL 3.1 (#214, 215, 267, 268) Database spreadsheet and expert system from Potomic Engineering.
NEWBASE (#233) Menu driven database for the beginner.
PC-DBMS (#383) A relational database management system that provides on-line help and screen editing functions.
ELSIE EXPERT SYSTEM (#398) Artificial intelligence shell to build a custom knowledge-base.
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INFOBASE (#340) Forms driver database management system similar to INFOSTAR.

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PC-PAD (#406) Spreadsheet and address book program written in basic.

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TIME AND MONEY (#251) Financial record keeping and analyze system
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KLP 1.9 (#332) Kinetics linear programming system
MATH PAK (#394) Programs to teach and accelerate some math functions. BASICA

LANGUAGES

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LADYBUG 1.0c (#94) Logo like program.
XLISP 1.4 (#148) Lisp language interpreter.
LAXON & PERRY FORTH (#263, 264)
MVP-FORTH (#31, #32) Two disk set of Mountain Valley Press Forth.
3 FORTHS (#352) To modify or expand your own forth language. MVPFORTH, FORTH-H, and SEATTLE Computer's Forth.
PROLOG & UNIFORTH (#417) Complete with editor and documentation.
SNOCREST BASIC (#409, #410) two disk set, Real basic interpreter with manual. Can be used with a multi-user system.
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PASCAL SETS

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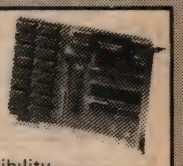


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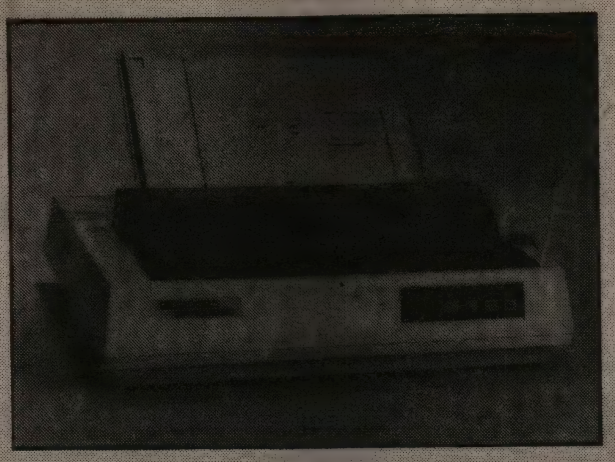
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SP-1000 PRINTER



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Low As $199

PRINTOUT SAMPLE

```
789:;<=>?@ABCDEF
<=>?@ABCDEFGHIJKLM
789:;<=>?@ABCDEFGHI
/0123456789:;<=>?@ABCDEFGHI
789:;<=>?@ABCDEF
<=>?@ABCDEFGHIJKLM
789:;<=>?@ABCDEFGHI
EFGHIJKL
789:;<=>?@ABCD EFGHIJKLMNOPQ
```

In order to keep your loyalty we at MidWest Micro are always looking for more printer and less price. In that search we've found for you a real gem in the price/performance arena. The Seikosha SP-1000 is made with the same precision and durability you have come to expect from the quality leader in the watch industry – Seiko.

The SP-1000 is completely full featured with the latest advances incorporated. It provides excellent near letter quality printing with a dense 24 by 18 dot density. This equates to 41,472 addressable dots per inch and gives superb "typewriter like" printing. Other printers with resolution this high cost hundreds of dollars more.

With the SP-1000 your computer can print 40, 48, 68, 80 or 136 characters per line. It can print 35 separate character styles including 13 double width and 3 reversed styles. You get Pica, Elite, Condensed and Italics – plus true superscripts and subscripts. All this can be done automatically, through easy commands right from your keyboard.

You get all these great features plus much, much more with the SP-1000 and there is a model made to fit your application. (This saves further in interfacing costs and problems). So call today to order or ask for a free brochure and print sample.

SP-1000 Series

	Your Price
• **SP-1000A,** Centronics parallel	$199
• **SP-1000AS,** RS-232C serial version	229
• **SP-1000 I,** IBM® PC compatible	229
• **SP-1000VC,** Commodore® C-64/C-128™ compatible	219
• **SP-1000AP,** Apple® IIC/Macintosh™ compatible	239

Features

- Impact dot matrix method, bi-directional in logic seeking, undirectional in graphic printing.
- 100 (Draft mode), 20 cps (Near Letter Qaulity) print speed, with reduced noise level.
- Pin-feed or friction-feed available.
- Automatic paper loading function.
- Paper empty detection.
- Input data dump in hexadecimal.
- Right, left margin set function.
- Self test printing.
- A variety of functions including Underline, Bold print, Double striking.
- A variety of print character sets including, Pica, Elite, Proportional, Elongated, Condensed, Italics, Super/Subscripts, and Italic Super/Subscripts.
- Automatic printing.
- Optional intelligent serial interface (#SP-80010)
- Downloadable Characters.
- Standard 1.5K buffer.

Character Font			Character Structure (H x V + Space)	Maximum Column Number	Character Spacing (Character/Inch)	Print Speed (Character/Second)
Standard Character	Standard	Pica	*12x9	80	10	100
		Elite	*12x9	96	12	50
		Condensed	*14x9	137	17	70
	Near Letter Quality	Pica	*24x18	80	10	20
		Elite	*12x18	96	12	24
Italic Cursive Character	Standard	Pica	*16x9	80	10	100
		Elite	*16x9	96	12	50
		Condensed	*18x9	137	17	70
	Near Letter Quality	Pica	*32x18	80	10	20
		Elite	*32x18	96	12	24
Graphic	Single Density Graphic		nx8	480 dot column	—	600 dot column
	Double Density Graphic		nx8	960 dot column	—	490 dot column
	Double Speed, Double Density Graphic		nx8	*960 dot column	—	600 dot column
	Quadruple Density Graphic		nx8	*1920 dot column	—	*980 dot column
	640 Dot Graphic		nx8	640 dot column	—	326 dot column
	576 Dot Graphic		nx8	576 dot column	—	294 dot column
	720 Dot Graphic		nx8	720 dot column	—	367 dot column

*Indicates that the specified figure includes half dots.

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With these capabilities behind us we are able to offer you a system package with the capatibility and flexibility you need, complete system software, and even nationwide service. You get the best savings and most power for your hard earned dollars. We look forward to your call and the opportunity to share this exceptional value with you.

Sincerely,

Mark Runkle
President
MidWest Micro

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The world's best-loved tramp certainly couldn't afford what big blue has to offer. But he can afford a Bondwell.

The Bondwell 34 is compatible with the PC in nearly every way but price (which is, however, fully compatible with your pocketbook).

For a cut-rate price, you get a first-rate system, with 256K RAM and two double-side, double-density, floppy disk drives (each with 360K formatted capacity). Plus a multipurpose interface card. An enhanced IBM-compatible keyboard. And five expansion slots, four of which are unoccupied and, as such, ready to accommodate the IBM® or IBM-compatible card of your choice.

Bondwell 34 users can cull from the world's fastest-growing library of home and business software. To get you started, MS-DOS™ and GWBASIC™ are both bundled with the computer. With them, you can execute such popular programs as Lotus 123, WordStar 2000®, Dbase III®, Multiplan,® Symphony™ and the like without a hitch.

When it comes right down to it, the Bondwell 34 is every "bit" as powerful as the PC but doesn't take as big a "byte" out of your budget.

The Bondwell 34. An affordable way to put the power of the PC in your home or office.

Bonus For each BW 34 computer you buy before March 31 at this special price we will send you at no charge 3 Bondwell TTL Monitors

Data Storage Configurations and Prices

A) 2 x 360K Disk Drives . . . . . $ 995
256K RAM

B) 1 x 360K Disk Drive $1599
1 x 10 Mb Disk Drive
256K RAM
MS DOS & GW Basic & Complete User Manuals

C) 1 x 360K Disk Drive $1799
1 x 20 Mb Disk Drive
256K RAM

SPECIFICATIONS

Processor 8088/4.77 MHz	**Keyboard** 84-key full-stroke keyboard	**Expansion** Centronics parallel port 5 expansion slots
Memory 256K byte User RAM 8k byte BIOS ROM	QWERTY layout IBM® compatible	**Operating System** MS-DOS™ PC DOS (not included)
Display (Optional) 12" monitor IBM® compatible Non-glare CRT face 80 characters x 25 lines Brightness & contrast control	**Disk Drive** Dual 5.25" floppy disk drives Double-side double-density 360-byte formatted capacity	**Included Software** 1 diskette containing 2 programs MS-DOS™ GW BASIC™

PC Buyers Checklist
- ☐ Product backed by major manufacturer
- ☐ Good documentation and manuals
- ☐ National service network
- ☐ IBM® Compatability



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Bondwell™ BW2 Laptop Portable ONLY $859

Super Bonus Buy your BW2 before March 31 and receive the BW 102 Modem Absolutely FREE



Rugged, compact, and light enough to carry anywhere, the Bondwell 2 can go with you wherever you go. What's more, its rechargeable battery eliminates the need for an external AC power source. Whether you're going from the office to the boardroom, or half way around the world, the Bondwell 2 can go right along with you.

Certainly, the old adage "good things come in small packages" applies to the Bondwell 2. This small package accommodates: —

- A full-sized (80x25) LCD screen
- A 3½ inch Microfloppy Disk Drive with 360K formatted capacity
- A 69 key, full-stroke keyboard, including 16 user-definable function keys
- Ports for connection with peripherals, such as a printer, modem, or second disk drive
- An expansion slot for ROM and RAM expansion

Model	Description	Your Price
BW-2	Lap Size Computer	$859
BW-102	BW-2 300 Baud Modem	119
BW-106	BW-2 Disk Drive	249
BW-108	BW-2 Carrying Case	79
BW-109	3½" SS/DD Diskettes	
BW-110	256 Ram Card for BW-2	159
BW-112	5¼" Disk Drive for BW-2	199
BW-303	BW-2 Printer Cable	29
BW-304	BW-2 RS232C Cable	29

You Get All This. . .

HARDWARE

CPU: Z80C CPU (low power) ● 4 MHz clock. **Memory:** 64K bytes user RAM ● 16K bytes video RAM ● 2K bytes monitor ROM ● 2K bytes character ROM. **Display:** 224mm x 70mm LCD Display ● Internal viewing angle adjustment ● 80 characters x 25 lines ● Character set includes standard ASCII characters, European languages characters and some graphic characters ● High resolution: 640 x 200 pixels. **Disk Drive:** A 3.5" Microfloppy disk drive ● Single-side double density (360K bytes formatted capacity) ● Lower power, battery operated. **Keyboard:** 69 full-stroke keys ● Low profile key tops ● Standard QWERTY layout ● Delete, control and escape keys ● 4 cursor control keys ● 8 programmable function keys with 16 user-defined functions. **Expansion:** One RS-232C compatible port for communication purposes ● Both asynchronous and synchronous operation ● Programmable transmission rate ● One Centronics-type parallel port for printer ● One drive port for additional disk drive ● One I/O slot for MODEM card, ROM card, or RAM card

SOFTWARE

Operating System: CP/M 2.2. **Software Included:** 5 diskettes containing 5 application programs and the CP/M operating system ● System utility program ● Wordstar® ● Mailmerge ● DataStar® ● CalcStar™ ● ReportStar®

GENERAL DESCRIPTION

Dimensions: 284mm(L) x 78mm(H) x 310mm(W), or 11.2 in(L) x 3.1 in(H) x 12.2 in(W). **Net Weight:** Approximately 5.5 kg (12 lbs.). **Power:** Built-in rechargeable battery ● Built-in switching power supply ● External AC-to-DC adapter

Bondwell™ CP/M Transportable

with software, par and ser ports, 2 disk drives

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We are one of the biggest marketers of printers for microcomputers and can assure you that you are saving hundreds of dollars without giving up a single benefit.

We have only a limited number of these printers so call now for your best chance of getting in on this "once in a blue moon" deal.

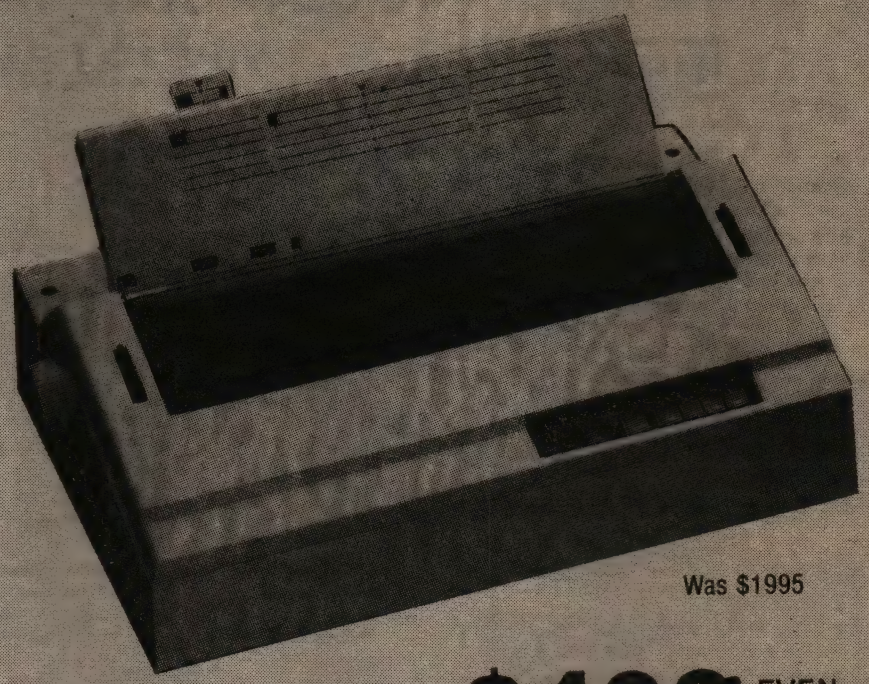
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Now you can get a full featured, wide carriage, 36 cps daisywheel printer. . .



Was $1995

Your Price Just **$499** EVEN LESS!

This top of the line daisywheel printer is made by a major market leader in daisywheel printer products. Its quality and durability are well known. Through special arrangements we are offering it to you direct. The price is far below the dealer quantity 100 price level. We fully support the product and make available all accessories that you may want for it. When this printer starts printing, hang on to your keyboard. It sprints through correspondence at a rapid 36 characters per second — that's one-third faster than the average daisywheel printer.

This bidirectional, logic seeking marvel lets you adjust the hammer intensity to print anything from single-page letters to five-part forms with equal clarity. A variety of impressive typestyles give you added print versatility.

It is exceptional in many other ways. The 15½" wide carriage briskly prints all your ledgers, spreadsheets, and extra wide business graphics with ease. With the optional cut sheet feeder and tractor feeder, you can print several copies on your letterhead and switch to pin-fed paper for high volume word or data processing.

The 7K buffer holds a substantial amount of data while its printing.

The average life of the print wheel is 10 million characters. Which means that you can run it eight hours a day — every day of the week — for almost two full years. Of course, under more normal usage, it will handle your business correspondence and graphics for up to five full years without service. That's impressive.

Quiet quality.
What your eyes don't tell you, your ears will. Because this printer is much quieter than many more expensive printers. So you can keep the noise down while you keep the cost down.

Specifications

Print Speed	36 CPS (Shannon text)
Print Wheel	96 petals/wheel, cassette type, ASCII stand.
Print Wheel Life	10 million char./wheel
Characters/Line	132 characters (1/10"), 158 characters (1/2"), 198 characters (1/15")
Paper Width	16.5 in max (419 mm)
Copy Capacity	Original (45 kg) + 4 copies (15 kg) (total thickness 0.35 mm max.)
Carriage Motion	Bidirectional, logic seeking
Carriage Rtrn Speed	750 ms (at 13.2" return)
Line Spacing	6, 4, 3 lines/inch, 1/48" proportional increments
Paper Feed	Bidirectional, logic seeking
Paper Feed Speed	4"/second

Available Ribbons	Ribbon Life
Single-strike black carbon film	60,000
Multi-strike black carbon film	150,000
Single-strike black correctable film	70,000
Multi-strike black fabric	500,000
Single-strike red film	2,000
Correction tape	1,500

Interfaces	Centronics – Parallel RS-232C – Serial
Buffer Size	7K
Control Panel	Indicators: Select, Power, Alarm, Line, Pitch, and Copy (LEDs) Switches: Select, Line Feed, TOF, Line, Pitch, and Copy
Noise	Operating – Less than 65 dB
Temperature	50 to 105 F – 10 to 40 C (operating)
Humidity	20% to 80% non-condensing (operating) 5% to 90% non-condensing (storage)
Power	120 V, 60 Hz (Optional: 120 or 220 - 240 V, 50/60 Hz) 130 W Max.
Dimensions	21.18 (W) x 7.65 (H) x 15.15 (D) inches (538(W) x 194.5 (H) x 385 (D) mm)
Weight	33 lbs (15 kg)
Optional Features	Tractor feeder, Auto Cut Sheet Feeder, Single and Multi-strike ribbons, Interchangeable printwheels (Numerous languages and typestyles)

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VIPC "XT Revision A"

USERS VIEW:



*Optional Monitors listed below:
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MANUFACTURER:
V.I.P.C. COMPUTERS of Hayward California. Assembled & tested in U.S.A. 1 Year Warranty, 100% Factory Burn In.

KEYBOARD:
KB—5150 style, 84 key layout, Numeric Lock LED display
Auto Repeat keys
Height adjustable tilt
Large "L" shape return key.

DISK DRIVES:
5¼" Standard Drives. Top Drive A, Bottom Drive B.

DELUXE KEYBOARD: *Optional
KB-5151 style layout. Separate Cursor & Numeric Pad. Num & Caps Lock status LED displays. Auto Repeat. Adjustable height tilt. Standard 5 pin Din plug.

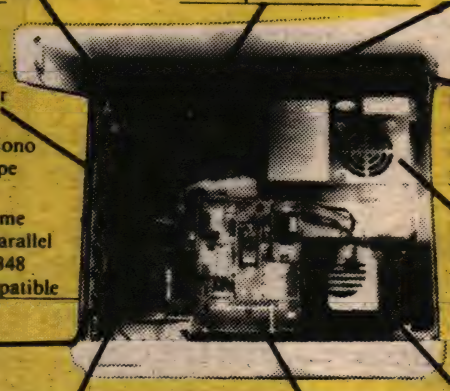
TECHNICAL REVIEW:

EXPANDABILITY:
8 IBM Compatible I/O Slot bus. Works with all Hardware for IBM PC/XT

MULTIFUNCTION CARD:
Drive controller, Parallel, Serial, optional second Serial, Clock Calendar W Battery Back-up, RAM disk, Spooler software.

***OPTIONAL PROCESSOR:**
INTEL 8087-3 Math CPU socket for volume numerical calculations.

VIDEO CARD:
R.G.B. Hi-Res 640 * 200 Pixel Display. (9 pin "D" TTL) Standard IBM Color signal.
Composite Color & Mono video output (RCA type jack).
*Optional Monochrome Graphics Display/Parallel Printer port. 720 * 348 Pixel Hercules Compatible



ENCLOSURE:
Convenient flip-top style metal case. Scratch resistant enamel surface.

POWER SUPPLY:
135 Watt output, 110 or 220 Volt operation. Quiet cooling fan. Ample current for high wattage consumption accessories.

CUSTOM LANGUAGES:
EPROM & ROM sockets, accepts 2764-27128 chips for custom BIOS applications.

RANDOM ACCESS MEMORY:
640K RAM on board. Utilizes 41256-150 N.S. RAM chips. 250% higher reliability factor based on 2 5ths amount of memory chips required with IBM PC XT for 640K RAM using 64K RAM chips. Memory versatility, single 256K or 640K RAM on board selectable jumper.

***HARD DRIVE AND TAPE BACK-UP UPGRADES:**
Room for two optional half height accessories. Auxilary cooling fan mounting capability.

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Model Teac-55BV 5¼", ½ Height, Double Sided, Double Density, 48 TPI, 360K Storage, Direct Drive, Quiet mechanism, low power consumption.

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FEATURES: 640K RAM on board, Dual Disk Drives, Multi-Ports, Parallel, Serial, Clock/Calendar Utility software, 8088 CPU, 4.77 MHZ Clock rate. Fully Hardware & Software compatible with all IBM PC/XT & Workalikes, Runs PC DOS, Flight Simulator, Lotus 1-2-3, Framework, dBase III, Auto Cad & other popular titles.

VIPC-XT SYSTEM FEATURES: 256K RAM, SUPER XT MOTHER BOARD, TEAC 55-BV DRIVE, CONTROLLER CARD, COLOR CARD, 135 WATT POWER SUPPLY, FLIP TOP CASE, IBM STYLE KEYBOARD. FULLY ASSEMBLED AND TESTED. **ONLY $699.**

SYSTEM ACCESSORIES:

DRIVES:

TEAC 55 BV 360K DS / DD	$85.00
TEAC 55-BV AT Beige panel	$89.00
TEAC 55-FV 720K D/S QUAD DENSITY	$109.00
TEAC 55-GFV 1.2 MEG D/S Q/D DOUBLE TRACK	$129.00
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MICROSCIENCE 10 MEG Hard Drive W Controller Card	$469.00
MICROSCIENCE 20 MEG Hard Drive W Controller Card	$669.00
WESTERN DIGITAL WDX2 Hard Drive Controller W Cable	$129.00
DTC-5150 BX Hard Drive Controller Card W Cable	$149.00
VIPC Color RGB & Composite outputs	$99.00
VIPC Monochrome Graphic Card W Printer port	$125.00
VIPC Floppy Controller Card W Cables	$69.00
VIPC 135 Watt Power Supply, replaces IBM's	$99.00
VIPC Flip-Top style case W mounting hardware	$59.00
VIPC Standard KB-5150 style keyboard	$69.00
VIPC Deluxe KB-5151 style W/cursor pad	$99.00
VIPC XT Type Mother Board W BIOS OK-640K RAM	$179.00
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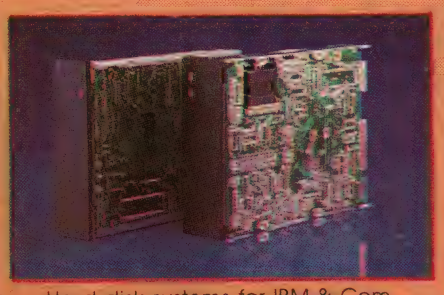
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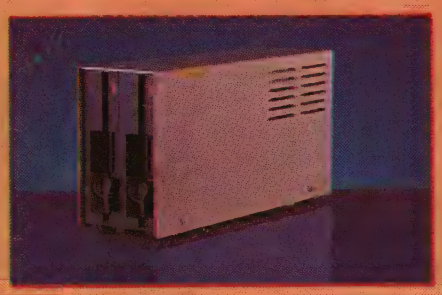


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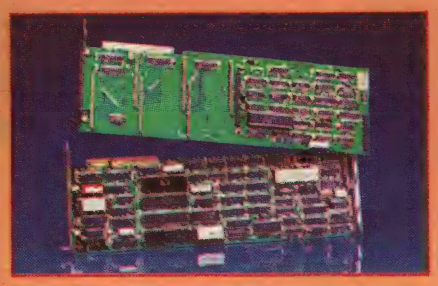


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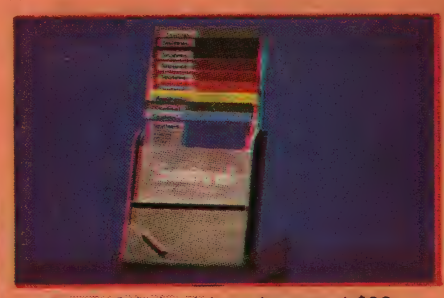
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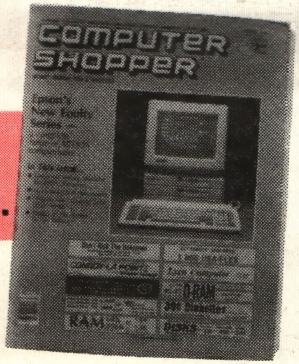
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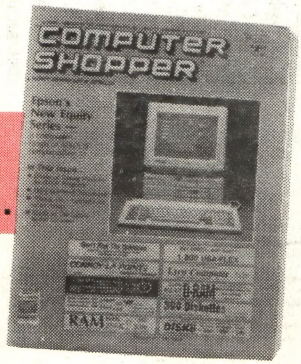
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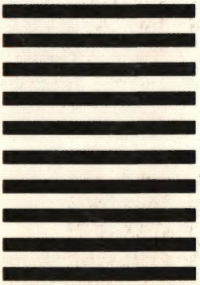


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